COMPACT HI-FI COMPONENT SYSTEM

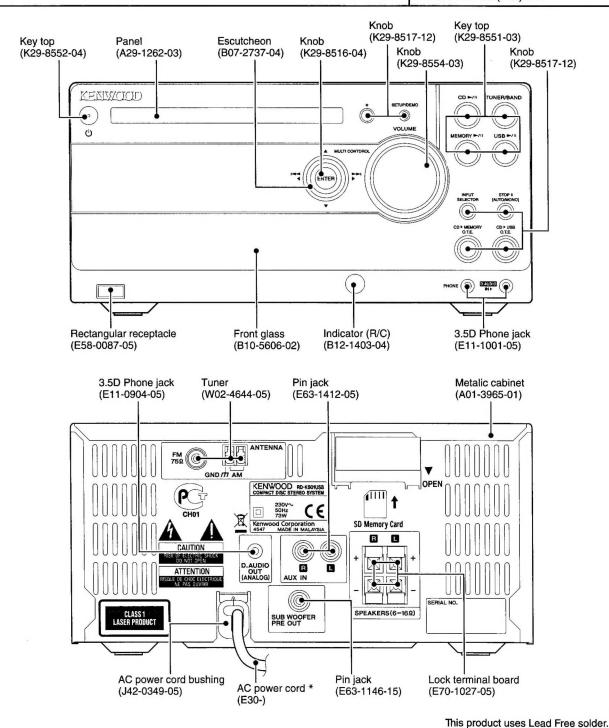
## RD-K501USB

# SERVICE MANUAL (K-501USB)

## **KENWOOD**

**Kenwood Corporation** 

© 2006-10 PRINTED IN KOREA B51-5993-00 (K/K) 219



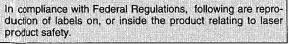
\* Refer to parts list on page 33.

This product complies with the RoHS directive for the European market.

KENWOOD Corp. certifies this equipment conforms to DHHS Regulations No.21 CFR 1040. 10, Chapter 1, subchapter J.

DANGER: Laser radiation when open and interlock defeated. AVOID DIRECT EXPOSURE TO BEAM.





### **ACCESSORIES / CAUTIONS / DISASSEMBLY FOR REPAIR**

#### **ACCESSORIES**

AM loop antenna (x 1) (T90-0893-05)



FM indoor antenna (x 1) (T90-0877-05)



Remote control unit (x 1) (A70-1715-05)



Remote control batteries (LR03(AAA)x 2)



| SYSTEM   | RECEIVER   | SPEAKER |  |
|----------|------------|---------|--|
| K-501USB | RD-K501USB | LS-K501 |  |

#### **CAUTIONS**

The marking of products using lasers CLASS 1 LASER PRODUCT

The marking this product has been classified as Class 1. It means that there is no danger of hazardous radiation outside the product. Location: Back panel

Information on Disposal of Old Electrical and Electronic Equipment (applicable for EU countries that have adopted separate waste collection systems)



#### **Memory Backup**

The setups in the system are backed up for about a day even after the power cord has been unplugged from the power outlet. The backed-up setups are as follows.

- Volume setting
- Balance setting
- Input level setting
- D-BASS, MANUAL EQ and SPRM function settings
- Timer settings DIMMER setting
- A.P.S. (Auto Power Save) setting

Tuner setups

- Tuning mode (Auto/manual)
- Receiving frequency
- Recording setups
- Recording speed
- Auto marking setting
   TEXT COPY setting
- Track mark setting

#### Recordable and Non-Recordable Sources

| Recording Destination Recording Source               | USB audio player | Memory card | Kenwood digital audio<br>played connected to<br>D.AUDIO OUT jack |
|--|------------------|-------------|--|
| USB audio player                                     | _                |             | 0  |
| Memory card  | <b>○</b> *1      |             | 0  |
| CD   | 0                | 0           | Ó  |
| Kenwood digital audio played connected to D.AUDIO IN |                  | 0           | _  |
| Radio  |                  | 0           | 0  |
| External component<br>(connected to AUX)             |                  | 0           | 0  |

Digital recording possible : Analog recording in normal recording speed only : X: Not possible recording Recording of music from the memory card to the USB audio player has the same effect as moving the music files from the former to the latter.

#### **Caution for Transport or Movement**

Before transporting or moving the system, prepare it as described below

Disconnect the USB audio player and take out the memory card and CD.

② Press the play/pause keys for the memory card and CD and confirm that message "NO CARD" or "NO DISC" is displayed

3 Wait a while, and then turn the system OFF.

(a) If an external component is connected, confirm that it is turned OFF and then unplug the connection cable.

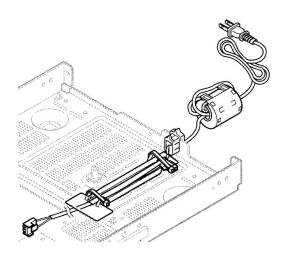
#### Resetting the Microcomputer

| Symptom   |                   | Flemedy   |
|---|-------------------|---|
| The microcomputer malfunctions (resulting in inoperability of the | cable while the s | ther may malfunction due to unplugged and plugging of a system is ON or to an extraneous cause. et the microcomputer with the following steps.  |
| system, erroneous display, etc.).                                 | 0                 | Unplug the power cord from the power outlet.  |
|   | 0 🖃               | While holding the power key on the main unit, plug the power cord again.  |
|   | 3 INI             | hen the microcomputer is reset, the message shown on the left is displayed.  * Resetting the microcomputer results in erasing the setups of the system and returns it to the factory-shipped condition. |

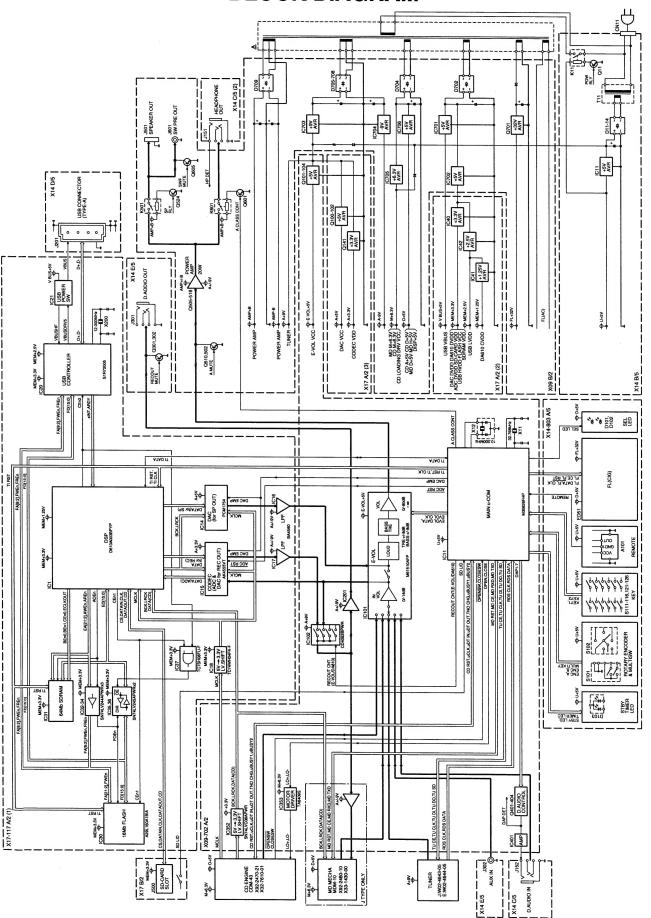
#### **DISASSEMBLY FOR REPAIR**

#### **How to Replace Power Supply Cord**

- 1. Arrange the power cord on the chassis and put the insulating board (F20-3633-13) on it.
- 2. Insert the wire band (J61-0307-05) to the hole (backwards) of the insulating board and fix it with the power cord to the hook on
- 3. Moreover band and fix the power cord and the insulating board with a wire band to hook on the chassis.
- 4. Also band and fix the power cord and the other side of insulating board with a wire band to hook (frontward) on the chassis.



### **BLOCK DIAGRAM**



## **CIRCUIT DESCRIPTION**

### 1. MICROPROCESSOR (X09:IC11;M30626FHP1BHA)

|       | OI HOOLOOOH | (703.10 | 11;W3U020FHP1BHA)                                      |                   |
|-------|-------------|---------|--|-------------------|
| PIN#  | PORT NAME   | I/O     | DESCRIPTIONS   |                   |
| 1     | FL_CLK      | OUT     | Clock for FL driver.                                   |                   |
| 2     | FL_DATA     | OUT     | Data for FL driver.                                    |                   |
| 3     | ENC_B       | IN      | Encode input for volume B                              |                   |
| 4     | ENC_A       | IN      | Encode input for volume B                              |                   |
| 5     | STANDBY LED | OUT     | Control for STANDBY's led.                             | H=ON/L=OFF        |
| 6     | TIMER LED   | OUT     | Control for timer's led.                               | H=ON/L=OFF        |
| 7     | SEL_LED     | OUT     | Control for selector's led.                            | H=ON/L=OFF        |
| 8     | BYTE        | IN      | Switch for 8/16 bits.                                  | L=16Bit/H=8Bit    |
| 9     | CNVss       | 11.4    | GND. CNVss port when writing data to flash-rom.        | E-TOBIUTI-OBIL    |
| 10    | XCIN        | IN      | Crystal oscillator port for timer.                     | (20.769kHz)       |
| 11    | XCOUT       |         |  | (32.768kHz)       |
|       |             | OUT     | Crystal oscillator port for timer.                     | (32.768kHz)       |
| 12    | RESET       | IN      | Input port for microprocessor reset.                   | L=RESET           |
| 13    | XOUT        | OUT     | Crystal oscillator port for main clock.                | (10MHz)           |
| 14    | Vss         |         | GND  |                   |
| 15    | XIN         | IN      | Crystal oscillator port for main clock.                | (10MHz)           |
| 16    | Vcc         |         | Power supply. (+3.3V). (backup)                        |                   |
| 17    | NC          | IN      | Connect to Vcc.  |                   |
| 18    | uBUSY2      | IN      | Busy port when reading TEXT data from CD drive.        | L→H=INTERRUPT     |
| 19    | uBUSY1      | IN      | Bi-direction port when communicating from/to CD drive. | L→H=INTERRUPT     |
| 20    | TNO CHG     | IN      | Interrupt to read the change of track # on CD drive.   | L→H=INTERRUPT     |
| 21    | CE          | IN      | Chip enable port when detecting backup.                | H=AC ON/ L=AC OFF |
| 22    | CD_RST      | OUT     | Reset output port for CD drive.                        | L=RESET           |
| 23    | OPEN SW     | IN      | CD tray open signal input.                             | L=SW ON           |
| 24    | CLOSE SW    | IN      | CD tray close signal input.                            | L=SW ON           |
| 25    | OPEN MOTOR  | OUT     | Tray open signal to motor.                             | H=OPEN            |
| 26    | CLOSE MOTOR | OUT     | Tray close signal to motor.                            | H=CLOSE           |
| 27    | MD CE       | OUT     | MD control signal.                                     | TI=OLOGE          |
| 28    | MD RST      | OUT     | MD control signal.                                     |                   |
| 29    | MD RXD      | IN      |  |                   |
|       |             |         | MD control signal.                                     |                   |
| 30    | MD TXD      | OUT     | MD control signal.                                     |                   |
| 31    | uDT IN      | OUT     | Data output to CD drive.                               |                   |
| 32    | uDT OUT     | IN      | Data input from CD drive.                              |                   |
| 33    | uCLK        | IN      | Clock input from CD drive.                             |                   |
| 34    | NC          | OUT     | Open.  |                   |
| 35    | TI_DATA     | I/O     | Data input/output port to/from DSP.                    |                   |
| 36    | TI_CLK      | I/O     | Clock input/output port to/from DSP.                   |                   |
| 37    | TI_RST      | OUT     | Reset signal output port to DSP.                       |                   |
| 38    | ADC_RST     | OUT     | Reset signal output port to ADC.                       |                   |
| 39    | DAC_EMP     | OUT     | Emphasis signal output port to DAC.                    | H=Emphasis-on     |
| 40    | SD_DET      | IN      | SD card door check.                                    | L=OPEN            |
| 41    | NC          | OUT     | Non connection   |                   |
| 42-45 | NC          | OUT     | Non connection   |                   |
| 46    | NC          | OUT     | Non connection   |                   |
| 47-49 | NC          | OUT     | Non connection   |                   |
| 50    | AMUTE2      | OUT     | Audio mute signal output port.                         | L=MUTE ON         |
| 51    | RECOUT_MUTE | OUT     | Recording mute signal output port.                     | L=MUTE ON         |
| 52    | DAUDIO_ATT2 | OUT     | Recording output level control signal for D.AUDIO.     |                   |
|       | NC          | OUT     |  | H=HIGH            |
| 53    |             |         | Non connection   |                   |
| 54    | RECOUT_CNT  | OUT     | Control signal for recoding output.                    | (NA045405D)       |
| 55    | EVOL DATA   | OUT     | Data output port to electronics volume.                | (M61510FP)        |
| 56    | EVOL CLK    | OUT     | Clock output port to electronics volume.               | (M61510FP)        |
| 57    | 10dB ATT    | OUT     | 10dB ATT control signal output port.                   | L=ATT ON          |
| 58    | STANBY      | OUT     | Standby control signal output port.                    |                   |
| 59    | SWF MUTE    | OUT     | Sub woofer mute signal output port.                    | L=MUTE ON         |
| 60    | SP_RLY      | OUT     | Speaker relay control port.                            |                   |

## **CIRCUIT DESCRIPTION**

| PIN#   | PORT NAME    | I/O | DESCRIPTIONS   |               |  |  |
|--------|--------------|-----|--|---------------|--|--|
| 61     | AMUTE        | OUT | Audio mute signal output port.                           | L=MUTE ON     |  |  |
| 62     | Vcc          |     | Power supply. (+3.3V). (backup)                          |               |  |  |
| 63     | NC           | OUT | Non connection   |               |  |  |
| 64     | Vss          |     | GND  | -             |  |  |
| 65     | DEST1        | IN  | Model selector   |               |  |  |
| 66     | DEST2        | IN  | Model selector   |               |  |  |
| 67     | NC           | OUT | Non connection   |               |  |  |
| 68     | TU CE        | OUT | Chip enable signal output port to PLL IC.                | (LC72131)     |  |  |
| 69     | TU DO        | IN  | Data input port from PLL IC.                             | (LC72131)     |  |  |
| 70     | TU CLK       | OUT | Clock signal output port to PLL IC.                      | (LC72131)     |  |  |
| 71     | TU DI        | OUT | Data output port to PLL IC.                              | (LC72132)     |  |  |
| 72     | TU SD        | IN  | SD input port from PLL IC.                               | (LC72131)     |  |  |
| 73     | RDS DATA     | IN  | Data input from RDS.                                     |               |  |  |
| 74     | REMOTE       | IN  | Remote control signal input port.                        |               |  |  |
| 75     | RDS CLK      | IN  | Clock input port from RDS to interrupt.                  |               |  |  |
| 76, 77 | NC           | OUT | Non connection   |               |  |  |
| 78     | POW. RLY     | OUT | Power relay control signal port.                         |               |  |  |
| 79     | ROM CK       | I/O | Clock output port to EEPROM.                             | (BR24C01AF-W) |  |  |
| 80     | ROM DT       | I/O | Data output port to EEPROM. (BR24C01AF-W)                |               |  |  |
| 81-87  | DAP_1-7      | OUT | Control output port for DAP.                             |               |  |  |
| 88     | HP_DET       | IN  | Detecting port for headphone jack.                       | L=connected   |  |  |
| 89     | AVR PROTECT1 | IN  | Non connection   |               |  |  |
| 90     | AVR PROTECT2 | IN  | Protection detecting port.                               |               |  |  |
| 91     | DC_PROT      | IN  | DC protection detecting port.                            |               |  |  |
| 92     | DAP_DET      | IN  | DAP detecting port.                                      | H=connected   |  |  |
| 93     | MULTI_KEY    | IN  | Input port for multi-key. (A-D)                          |               |  |  |
| 94     | KEY1         | IN  | Input port for key-1. (A-D)                              |               |  |  |
| 95     | KEY2         | IN  | Input port for key-2. (A-D)                              |               |  |  |
| 96     | Avss         |     | GND  |               |  |  |
| 97     | FL_RST       | OUT | Reset signal output to FL driver.                        | L=RESET       |  |  |
| 98     | Vref         |     | Standard voltage input port for analog-to digital conver | ter.(+3.3V)   |  |  |
| 99     | Avcc         |     | Power supply port for analog-to digital converter. (+3.  | 3V) backup.   |  |  |
| 100    | FL_CE        | OUT | Chip enable output port to FL driver.                    |               |  |  |

#### Analog-to-Digital vs Operation

#### 1.Keys

| input     | KEY 1             | KEY 2          | MULTI KEY   |
|-----------|-------------------|----------------|-------------|
| (V)       | Pin94(AN2)        | Pin95(AN1)     | Pin93(AN3)  |
| 0.00~0.29 | POWER             | TUNER          | ENTER       |
| 0.41~1.17 | CD OPEN/CLOSE     | USB PLAY/PAUSE | MULTI UP    |
| 1.27~2.05 | SETUP             | STOP           | MULTI LEFT  |
| 2.16~2.95 | CD PLAY/PAUSE     | CD→USB         | MULTI DOWN  |
| 3.06~3.77 | MEMORY PLAY/PAUSE | CD→MEMORY      | MULTI RIGHT |
| 3.88~4.59 | AUX/DAP           | KEY OFF        | KEY OFF     |
| 4.60~5.00 | KEY OFF           | KEY OFF        | KEY OFF     |

#### 2. DC Protection

| port logic | DC_PROT (Pin91) |
|------------|-----------------|
| Н          | protection on   |
| L          | protection off  |

#### 3. Thermal Protection

| input     | AVR PROTECT2   |
|-----------|----------------|
| (V)       | Pin90(AN6)     |
| 0.00~1.40 | protection on  |
| 1.41~5.0  | protection off |

#### 4. D. AUDIO

| input     | DAP_DET        |  |
|-----------|----------------|--|
| (V)       | Pin92(AN4)     |  |
| 0.00~0.10 | non connection |  |
| 0.12~3.0  | connection     |  |

### **CIRCUIT DESCRIPTION**

2. SOUND CONTROL IC (X09; IC101: M61510AFP)

| PIN#  | PORT NAME        | DESCRIPTIONS   |
|-------|------------------|--|
| 1     | REF IN           | Input port of the reference amplifier.   |
| 2     | REF OUT          | Output port of the reference amplifier.  |
| 3-7   | IN 1A-1E         | Input port of selector A-E (ch-1).   |
| 8     | IN VOL OUT1      | Output port of volume. (ch-1).   |
| 9     | VSELA IN1/REC-C1 | Input port of volume input selector A/output port of REC-C. (ch-1)             |
| 10    | VSEL OUT1        | To reduce the volume changing noise. (ch-1)                                    |
| 11    | LOUD1            | Setting port of loudness characteristic curve. (ch-1)                          |
| 12,13 | BI1/BO1          | Setting port of Bass tone characteristic curve. (ch-1)                         |
| 14,15 | MI1/MO1          | Setting port of Mid tone characteristic curve. (ch-1)                          |
| 16    | TRE1             | Setting port of Treble tone characteristic curve. (ch-1)                       |
| 17    | VSELB OUT1       | Output port of volume input B. (ch-1)  |
| 18    | VOL IN1          | Input port of main volume. (ch-1)  |
| 19    | VOL OUT1         | Output port of main volume1. (ch-1)  |
| 20    | VCC              | Power supply.  |
| 21    | DATA             | Input port of serial data.   |
| 22    | CLOCK            | Input port of clock signal.  |
| 23    | GND              | GND.   |
| 24    | VOL OUT2         | Output port of main volume1. (ch-2)  |
| 25    | VOL IN2          | Input port of main volume. (ch-2)  |
| 26_   | VSELB OUT2       | Output port of volume input B. (ch-2)  |
| 27    | TRE2             | Setting port of Treble tone characteristic curve. (ch-2)                       |
| 28,29 | MI2/MO2          | Setting port of Mid tone characteristic curve. (ch-2)                          |
| 30,31 | BI2/BO2          | Setting port of Bass tone characteristic curve. (ch-2)                         |
| 32    | LOUD2            | Setting port of loudness characteristic curve. (ch-2)                          |
| 33    | VSEL OUT2        | To reduce the volume changing noise. (ch-2)                                    |
| 34    | VSELA IN2/REC-C2 | Input port of volume input selector A/output port of REC-C. (ch-2)             |
| 35    | IN VOL OUT2      | Output port of volume input. (ch-2).   |
| 36-40 | IN 2A-2E         | Input port of selector A-E (ch-2).   |
| 41    | REC-B2/SUR1      | Output port of REC-B. (ch-2)./Device connection port of external surround one. |
| 42    | REC-B1/SUR2      | Output port of REC-B. (ch-1)./Device connection port of external surround one. |

#### Specification of Sound Controller IC (X09; IC101: M61510AFP)

This IC controls main volume, recording level, and selector.

#### (a) Tone Control

Fixed

| tr    | treble      |       |                 |             | bass       | volume input | loudness |          | tone input |
|-------|-------------|-------|-----------------|-------------|------------|--------------|----------|----------|------------|
| value | attenuation | value | mid attenuation | attenuation | selector B | switch       | surround | selector |            |
| +8    | +8dB        | +8    | +8dB            |             |            |              |          |          |            |
| +6    | +6dB        | +6    | +6dB            |             |            |              | 1        |          |            |
| +4    | +4dB        | +4    | +4dB            |             |            | l            |          |          |            |
| +2    | +2dB        | +2    | +2dB            |             |            |              |          |          |            |
| 0     | 0dB         | 0     | 0dB             | 0dB         | tone       | off          | off      | bypass   |            |
| -2    | -2dB        | -2    | -2dB            |             |            |              |          | ,        |            |
| -4    | -4dB        | -4    | -4dB            |             |            |              |          |          |            |
| -6    | -6dB        | -6    | -6dB            |             |            |              |          |          |            |
| -8    | -8dB        | -8    | -8dB            |             |            |              |          |          |            |

<sup>\*</sup> Attenuate the maximum level to 0dB if the sum of tone's value and volume value will be over 0dB.

Flat

| tone control |        |     |      | volume input | loudness |          | tone input |
|--------------|--------|-----|------|--------------|----------|----------|------------|
|              | treble | mid | bass | selector B   | switch   | surround | selector   |
| ALL OFF      |        |     |      | bypass       | off      | off      | bypass     |

## **CIRCUIT DESCRIPTION**

#### (b) Master Volume

Master volume is consist of pre and post volumes and 10dB attenuation.

| volume level | attenuation (dB) | pre volume (dB) | post volume (dB) | 10dB Att (57Pin) |
|--------------|------------------|-----------------|------------------|------------------|
| 0            | -80              | -16             | -∞               |                  |
| 11           | -80              | -16             | ∞                |                  |
| 2            | -79              | -16             | -53              |                  |
| 3            | -75              | -16             | -49              |                  |
| 4            | -71              | -16             | -45              | _1               |
| 5            | -67              | -16             | -41              |                  |
| 6            | -63              | -16             | -37              |                  |
| 7            | -63<br>-59       | -16             | -33              |                  |
| 8            | -55              | -16             | -29              |                  |
| 9            | -51              | -16             | -25              |                  |
| 10           | -48              | -15             | -23              |                  |
| 11           | -45              | -15             | -20              |                  |
| 12           | -42              | -15             | -17              |                  |
| 13           | -39              | -14             | -15              |                  |
| 14           | -36              | -14             | -12              | ON (Low)         |
| 15           | -34              | -13             | -11              |                  |
| 16           | -32              | -13             | -9               |                  |
| 17           | -30              | -12             | -8               |                  |
| 18           | -28              | -12             | -6               |                  |
| 19           | -26              | -11             | -5               |                  |
| 20           | -24              | -10             | -4               |                  |
| 21           | -22              | -9              | -3               |                  |
| 22           | -20              | -9<br>-8<br>-7  | -2               |                  |
| 23           | -18              | -7              | -1               |                  |
| 24           | -17              | -6              | -1               |                  |
| 25           | -16              | -5              | -1               |                  |
| 26           | -15              | -4              | -1               | _                |
| 27           | -14              | -4              | Ö                |                  |
| 28           | -13              | -3              | Ö                |                  |
| 29           | -11              | -3              | -8               |                  |
| 30           | -10              | -3<br>-2        | -8               | _                |
| 31           | -9               | -2              | -7               | _                |
| 32           | -8               | -2              | -6               | -                |
| 33           | -7               | -1              | -6               | _                |
| 34           | -6               | -i              | -5               |                  |
| 35           | -5               | -1              | -4               | OFF (High)       |
| 36           | -4               | -1              | -3               |                  |
| 37           | -3               | 0               | -3               | -                |
| 38           | -2               | 0               | -2               | -                |
| 39           | -1               | 0               | -1               | _                |
| 40           | 0                | 0               | 0                | -                |

#### (c) Input volume data (D14="1",D15="1")

(1)Selector

| ( )        |              |
|------------|--------------|
| selector   | default      |
| TUNER      | -4dB         |
| CD         | 0dB          |
| MD         | 0dB          |
| MEMORY/USB | 0dB          |
| AUX        | -6dB (varia) |
| P.HDD      | -6dB (varia) |
|            |              |

(2) AUX, D.AUDIO

| volume level | ATT.  |
|--------------|-------|
| +3           | 0dB   |
| +2           | -2dB  |
| +1           | -4dB  |
| 0            | -6dB  |
| -1           | -8dB  |
| -2           | -10dB |
| -3           | -12dB |

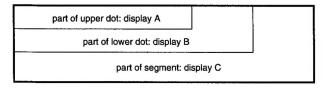
#### (d) DISP IC (X17; IC1: D610A003BPYP)

| D BASS |       |
|--------|-------|
| value  | ATT.  |
| 0      | -∞dB  |
| 1      | -8dB  |
| 2      | -6dB  |
| 2<br>3 | -4dB  |
| 4      | -2dB  |
| 5      | 0dB   |
| 6      | +2dB  |
| 7      | +4dB  |
| 8      | +6dB  |
| 9      | +8dB  |
| 10     | +10dB |

### **TEST MODE**

#### 3. Test mode

#### 1. Display



#### 2. Operation in Test Mode

In test mode, "demo" mode have to be in cancel.

In test mode, remote control key and key on the unit are not available for normal operation.

In test mode, any keys not listed in the following table are test mode operation.

In test mode, mute does not work. But mute works when power switch is on/off.

#### 3. TUNER Check Mode

#### 3-1 Setting to test mode

Turn on with pressing [STOP] key.

#### 3-2 Condition after setting to Test mode.

| selector        | TUNER FM  |
|-----------------|---|
| Display         | All dots and segments turn on. Illumination on the front panel turns on. Cancellation of turn-on is available with pressing key on the front panel or remote control          |
| LED             | Red and umber leds on standby turns on for 250mS alternately. Other leds turn on. Cancellation of turn-on is available with pressing key on the front panel or remote control |
| TUNING FERQ     | 98.3MHz   |
| MAIN Vol LEVEL  | Set to "35".  |
| AUX INPUT LEVEL | Set to value of initialization.   |
| SOUND MODE      | OFF   |
| TONE CONTROL    | FLAT(0)   |
| etc.            | Set to value of initialization. CD tray will be open. Supreme is OFF.   |

#### 3-3 Key operation in Test Mode

| key            | display A  | display B | display C | remarks   |
|----------------|------------|-----------|-----------|---|
| ENTER (cyclic) | ******-*E* | DSP:***** |           | Shows version of microprocessor and EEPROM. Shows "-" if no EEPROM Does version of DSP on part B. |

#### 3-4 Others

Shows blinking "SD LID OPEN" on part B if SD pocket door opens.

#### 4. CD Check Mode

#### 4-1 Setting to test mode

Turn on with pressing [CD PLAY/PAUSE] key.

#### 4-2 Condition after setting to Test Mode.

| selector        | CD   |
|-----------------|--|
| Display         | Display shows "CD _TEST" in dot part A and "version of microprocessor on CD" in B. |
| LED             | Stand-by led (red) blinks for 500mS period.  |
| MAIN Vol LEVEL  | Set to "35".   |
| AUX INPUT LEVEL | Set to value of initialization.  |
| REC INPUT       | Analog   |
| SOUND MODE      | OFF  |
| TONE CONTROL    | FLAT(0)  |
| etc.            | Set to value of initialization. CD tray will be open. Supreme is OFF.              |

### **TEST MODE**

#### 4-3 Key operation in Test Mode

| key   | display A                  | display B  | display C | remarks  |
|---|----------------------------|--|-----------|--|
| PLAY/PAUSE (cyclic)   | norr                       | nal  |           | Normal playback and pause works.   |
| STOP (in playback)  | CD_TEST                    | CD U-COM ver   | -         | Initialization in test mode after playback stops. (Not resume mode)  |
| STOP (in stop mode)   |                            |  |           | Shows self adjustment value  |
|   | 06 MODE                    | ** ##  | -         | ** (FG), ##(FEXP)  |
|   | 07 MODE                    | ** ##  |           | ** (FBAL), ##(FOFS)  |
|   | 08 MODE                    | ** ##  |           | ** (TG), ##(TEXP)  |
|   | 09 MODE                    | ** ##  |           | ** (TBAL), ##(TOFS)  |
|   | 10 MODE                    | ** ##  |           | ** (FMAX), ##(FMIN)  |
| SKIP-UP/DOWN  | non                        | nal  |           | Normal skip-up and down works  |
| SKIP-UP/DOWN<br>(pressing 500mS<br>period in playback mode)   |                            |  |           | Pickup moves in FF mode with UP key.Pickup does in FB mode with DOWN key   |
| (cyclic, in stop mode)  O5 MODE ←→ 03MODE  Tracking Servo will be off immer Playback will start at 1 min. in the 100 mS outwards after pressin Tracking servo will turn on at starts. |                            | Tracking Servo will be on after self adjustment (05 MODE). Tracking Servo will be off immediately (03 MODE). Playback will start at 1 min. in the first music (pickup moves 100 mS outwards after pressing start limit switch). Tracking servo will turn on at start position of 03 MODE when changing MODE from 03 MODE to 05 MODE. |           |  |
| SKIP-UP/DOWN<br>(pressing 500mS<br>period in stop mode)   | CD_TEST                    | PICK OUT/<br>PICK IN   | normal    | With pressing UP key, pickup moves outwards. Pickup will stop if not pressed UP key. With pressing DOWN key, pickup moves inwards. Pickup will stop if not pressed DOWN key. |
| Memory OTE  | SD OTE F**                 | MD OTE T**   | normal    | High One Touch Edit(OTE)will start from CD to Memory in LP4 mode.  |
| SETUP (cyclic)  | REC INPUT                  | DIGITAL or<br>ANALOG   | normal    | Switch recording input source alternately if pressed SETUP key.  |
| NEXT  | SL check ◀►<br>QDATA_***** | normal   | normal    | Shows position of start limit with pressing SETUP key after playback 05 mode   |

#### 4-4 Others

Shows blinking "SD LID OPEN" on part B if SD pocket door opens.

In detecting "door open ", TWIN REC does not work if O.T.E.key of memory is pressed.

#### 5. SD Card

#### 5-1 Setting to test mode

Turn on with pressing Memory play/pause key.

#### 5-2 Key operation in Test Mode

| key                            | display A   | display B | display C | remarks  |
|--------------------------------|-------------|-----------|-----------|--|
| Memory play/pause<br>+power on | FORMAT&INIT | normal    | normal    | This test mode executes SD card format and Initialization. Turn the power off mode after initialization. Shows "NO CARD" if no SD card. Unit to stop after show "SD ERROR" |

#### 6. Shipment initialization from factory

#### 6-1 Setting to test mode

Turn on with pressing POWER key.

#### 6-2 Key operation in Test Mode

| step   | display   |  |  |
|--|---|--|--|
| Initialize ram in main microprocessor and backup data. | -   |  |  |
| 2. Power on  | Display shows "INITIALIZE" in executing. Retune to standby mode if unit has no error. |  |  |
| 3. Mechanism initialization                            | Error shows on display if mechanism and/or switches.                                  |  |  |

#### 6-3 CD Mechanism Initialization

Unit executes the same initialization as turn-on's that.

In initialization, display shows "CD ERROR" if any trouble.

#### 7. Canceling Test Mode

If you want to write initialization value to microprocessor you have to pull out the power cord from ac outlet.

If you turn off the power switch the unit will be ended test mode without writing initialization value to microprocessor.

### **ADJUSTMENT**

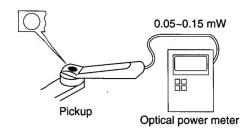
| No. | ITEM                            | INPUT<br>SETTINGS         | OUTPUT<br>SETTINGS  | AMPLIFIER<br>SETTINGS | ALIGNMENT<br>POINTS                 | ALIGN FOR | FIG. |
|-----|---------------------------------|---------------------------|---|-----------------------|-------------------------------------|-----------|------|
| Unl | ess otherwise spe<br>POWER : ON | cified, the ind<br>SELECT | ividual switches should<br>OR : CD  | d be set as follo     | wing :                              |           |      |
| 1   | BIAS                            | -                         | Connect a DC voltmeter to pin #1 and 2 of CN502 (L-ch) or pin #3 and 4 of CN 502 (R-ch) (X09) | VOLUME : 0            | VR501 (Lch)<br>VR502 (Rch)<br>(X09) | 10 mV     |      |

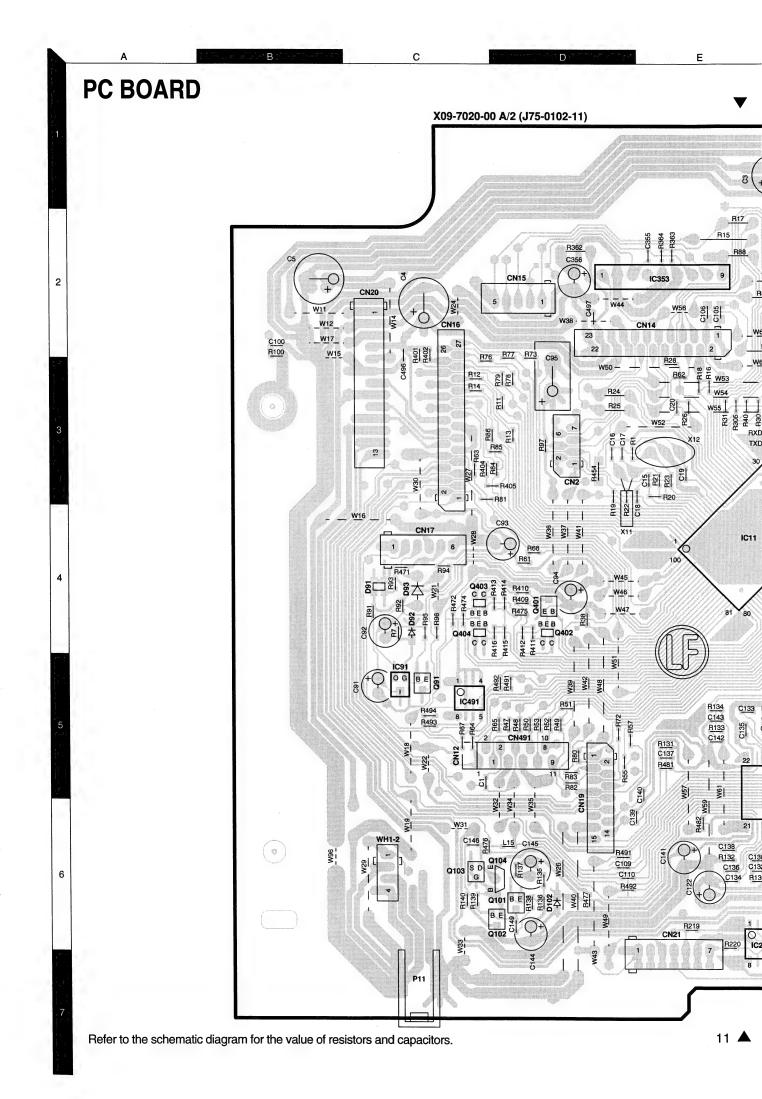
#### **CD** check

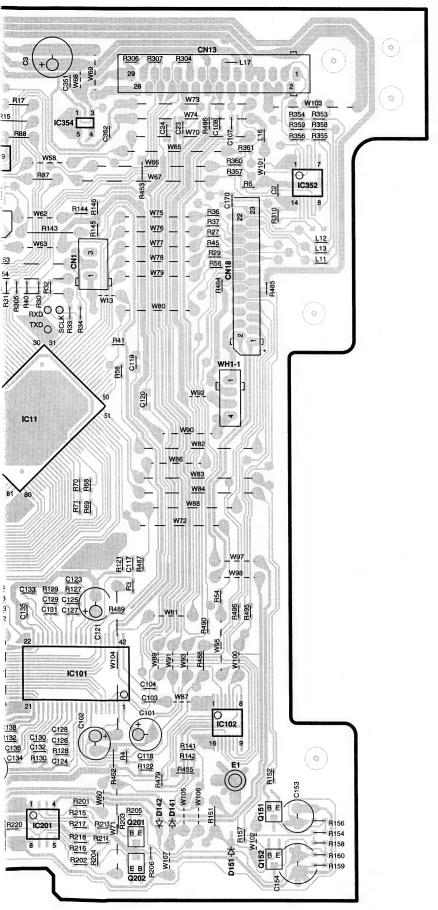
| No. | ITEM                    | INPUT<br>SETTING | OUTPUT<br>SETTING   | PLAYER<br>SETTING   | ALIGNMENT<br>POINT | ALIGN FOR   | FIG. |
|-----|-------------------------|------------------|---|---|--------------------|---|------|
|     | EST MODE<br>ST MODE : W | /hile pressir    | ng the [CD PLAY/PAI   | JSE] key, turn power  | on.                |   |      |
| 1   | LASER<br>POWER          | _                | Set the sensor section of the optical power meter on the pickup lens. | Short circuit OPEN/CLOSE SW. Press the "ENTER" key to check that the display is "03". | -                  | On the power from<br>0.05 to 0.15mw. when<br>the diffraction grating<br>is correctly aligned<br>with the RF level of<br>0.8Vp-p or more | (a)  |

Type 4disc :SONY YEDS-18 Test Disc or equivalent. (KTD-02) LPF : Around  $47k\Omega + 390pF$  or so.

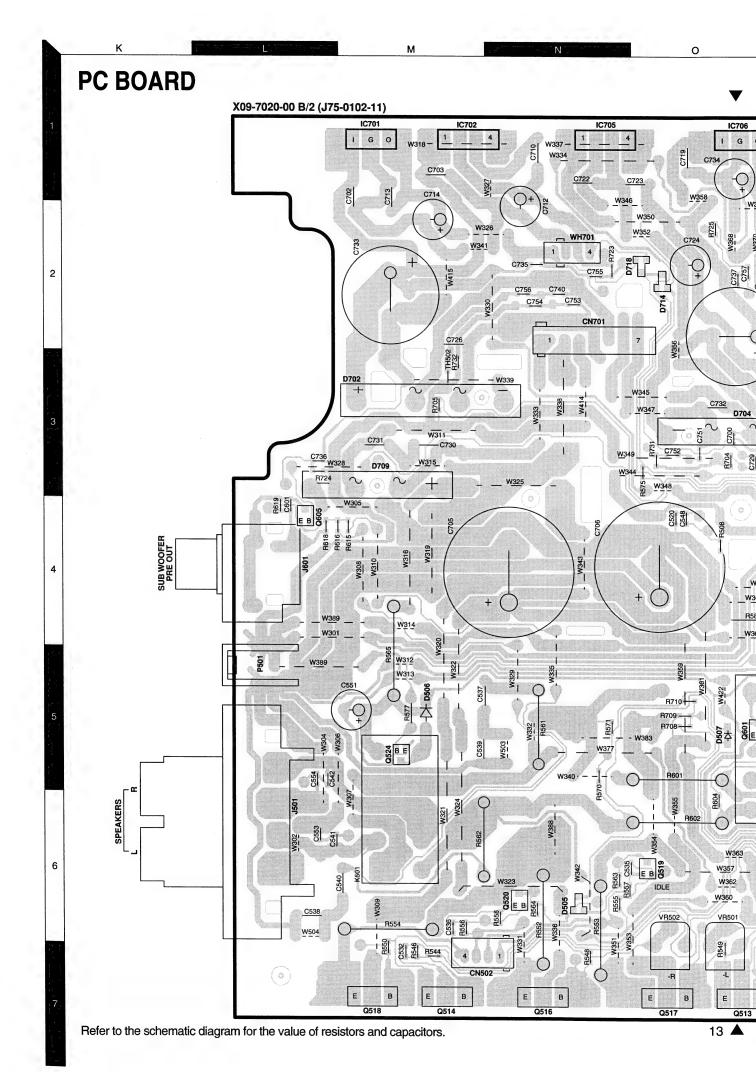
#### (a) Laser Power

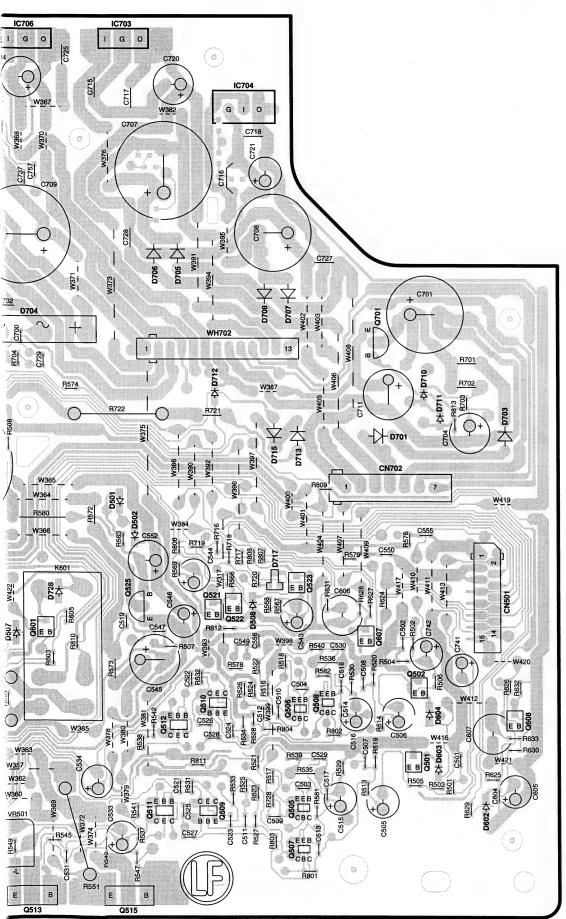


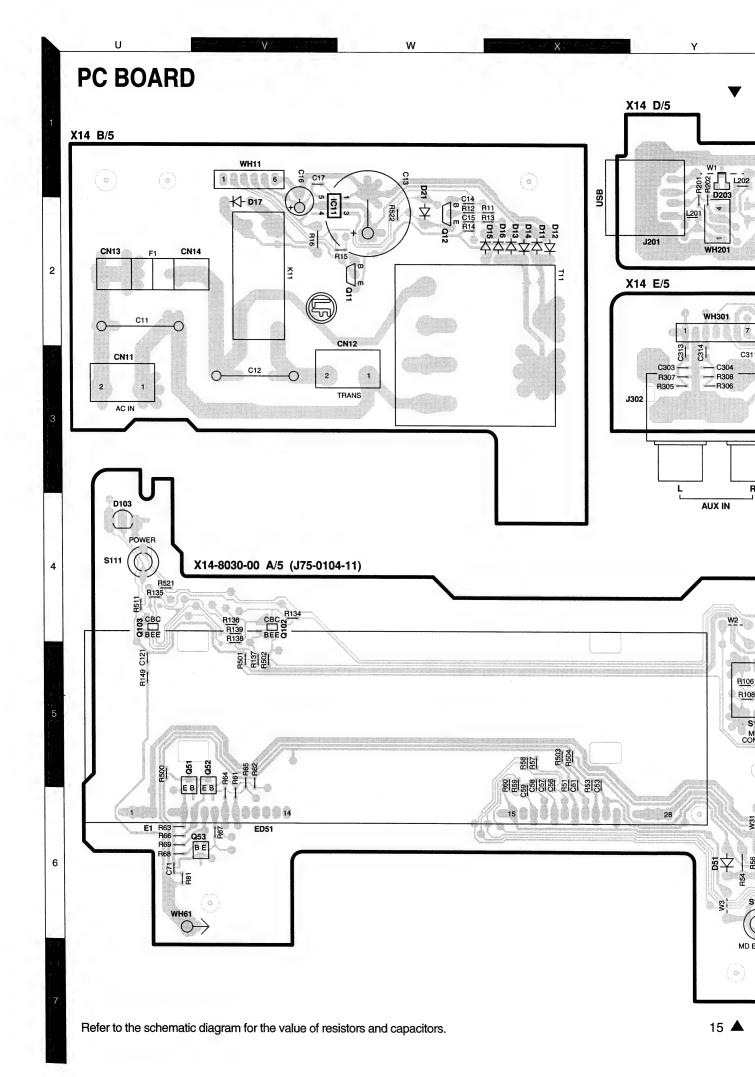




2



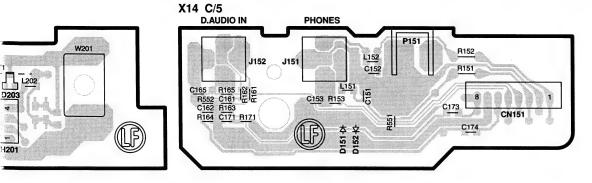


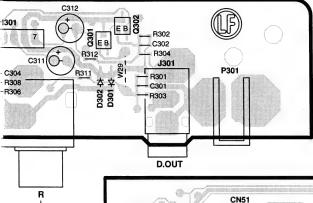


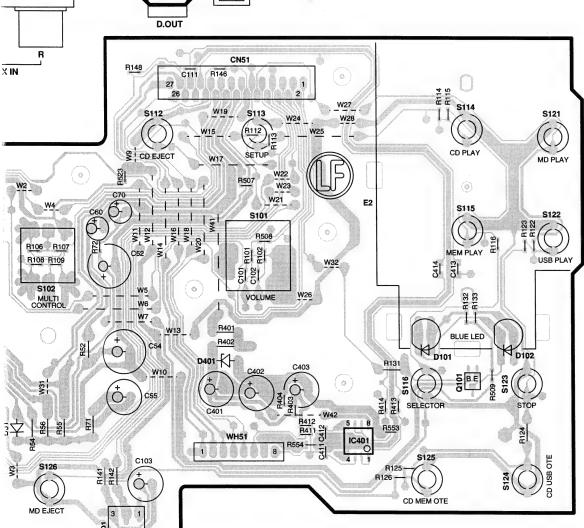


ΑD







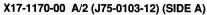


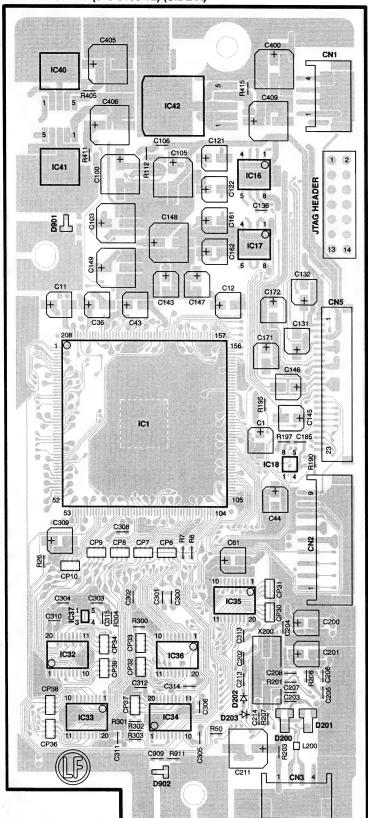
2

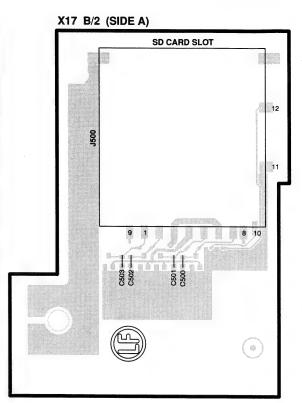
4

6

## **PC BOARD**





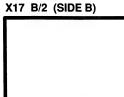


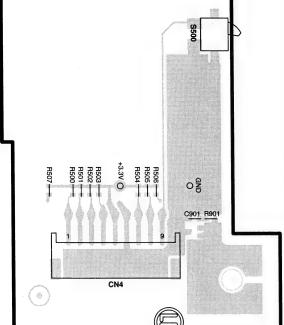
2

4

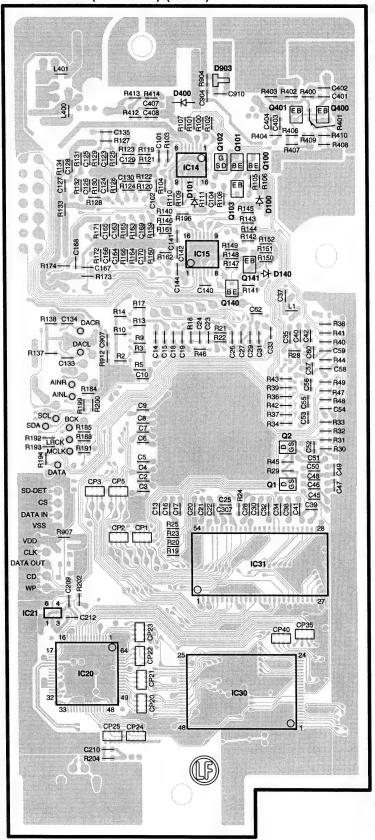
6

### **PC BOARD**





X17-1170-00 A/2 (J75-0103-12) (SIDE B)

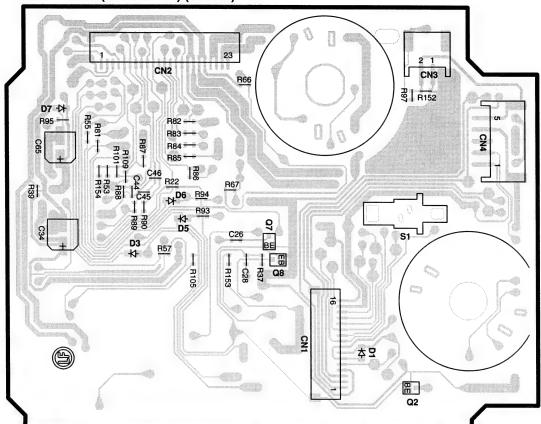


### **PC BOARD**

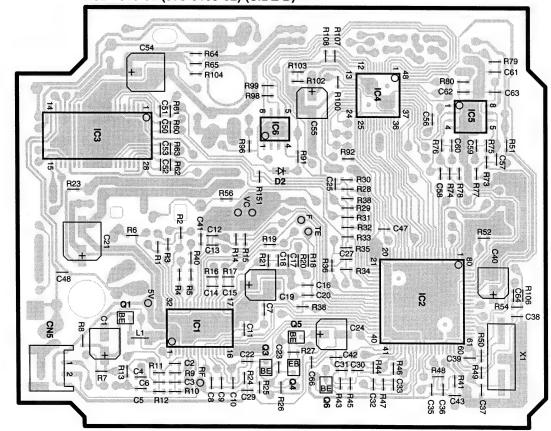
2

6

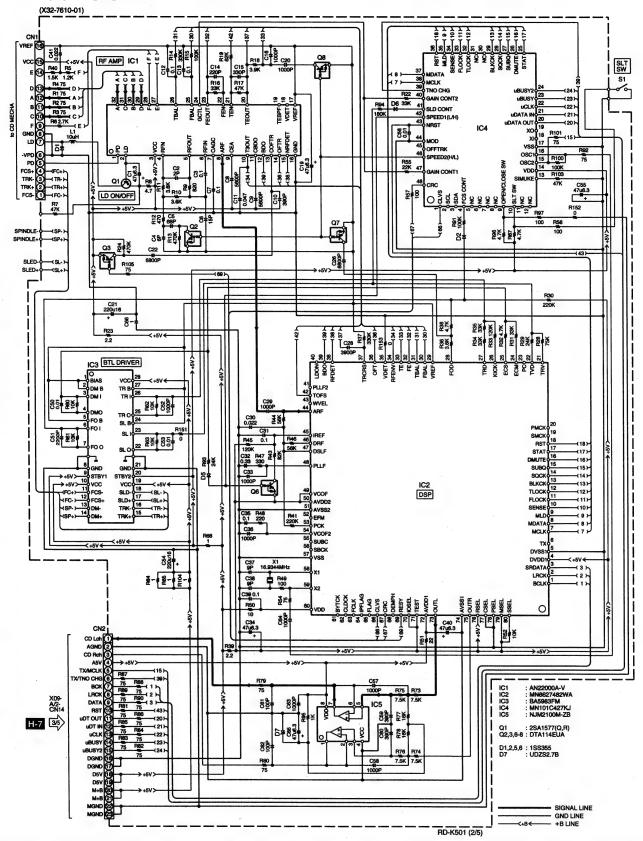
#### X32-7610-01 (J75-0109-02) (SIDE A)



#### X32-7610-01 (J75-0109-02) (SIDE B)

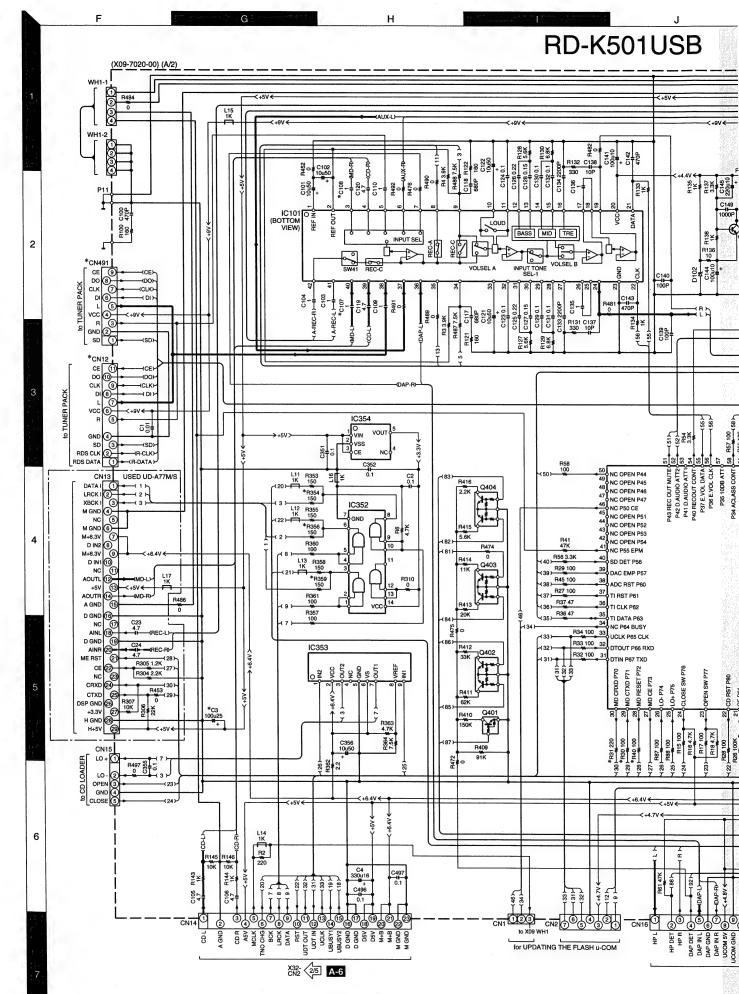


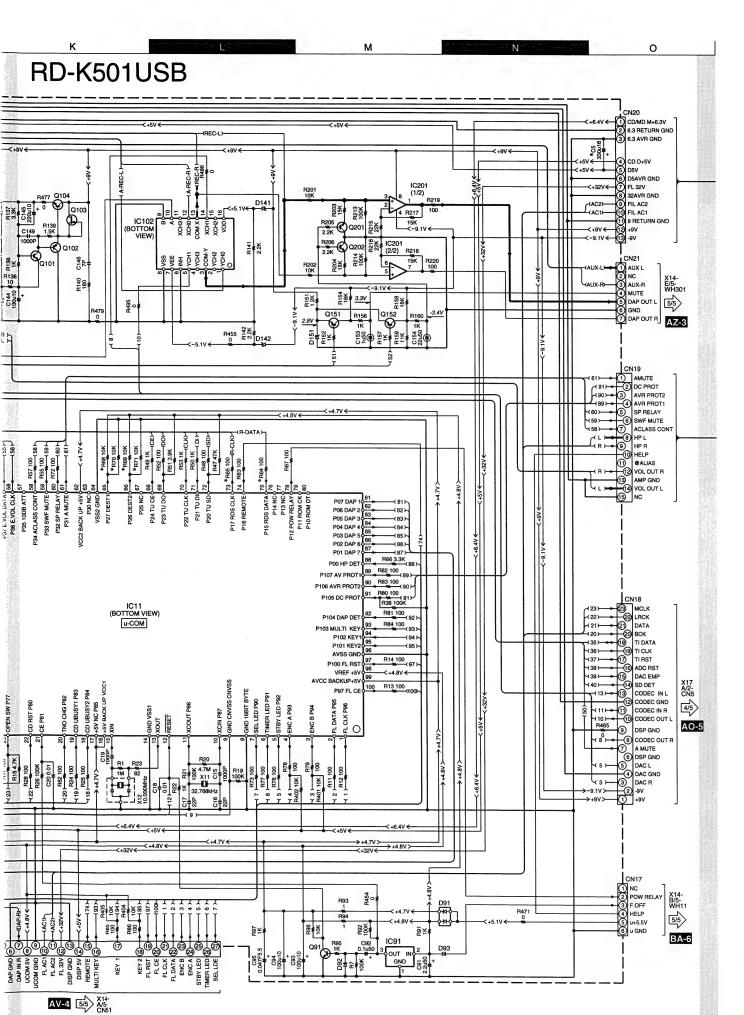
2

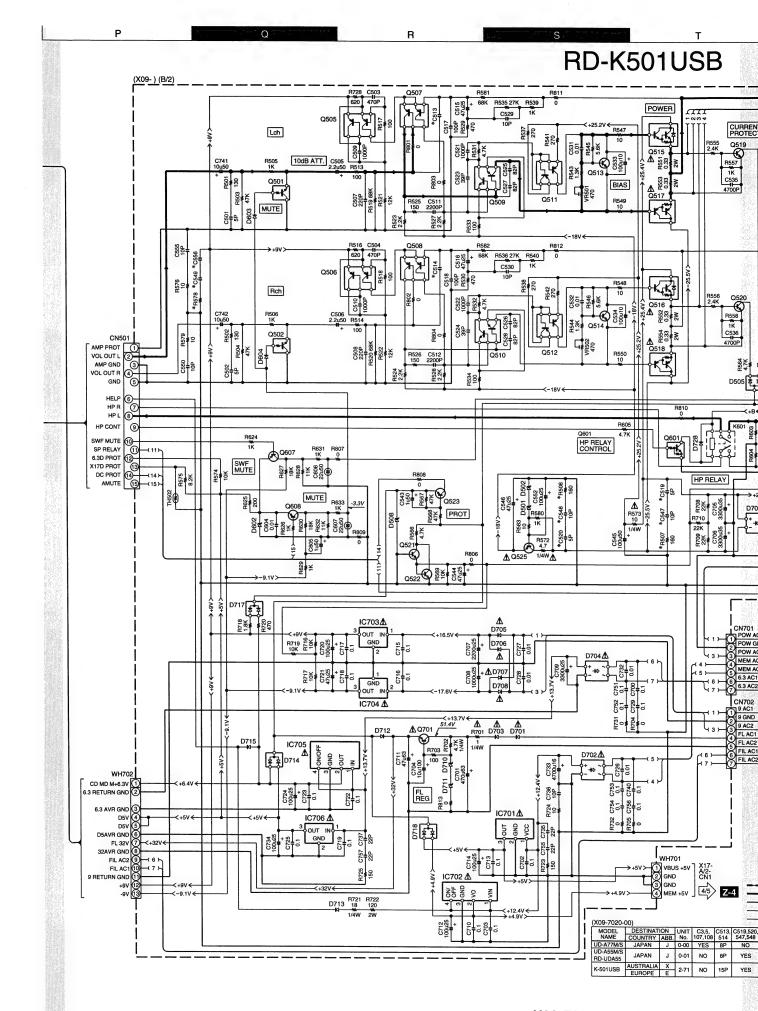


**CAUTION:** For continued safety, replace safety critical components only with manufacturer's recommended parts (refer to parts list). △ indicates safety critical components. For continued protection against risk of fire, replace only with same type and rating fuse(s). To reduce the risk of electric shock, leakage-current or resistance measurements shall be carried out (exposed parts are acceptably insulated from the supply circuit) before the appliance is returned to the customer.

The DC voltage is an actual reading measured with a high impedance type voltmeter with no signal input. The measurement value may vary depending on the measuring instruments used or on the product.





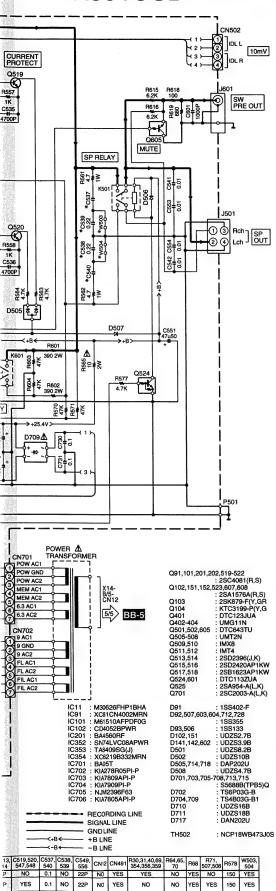


2

4

6

### RD-K501USB

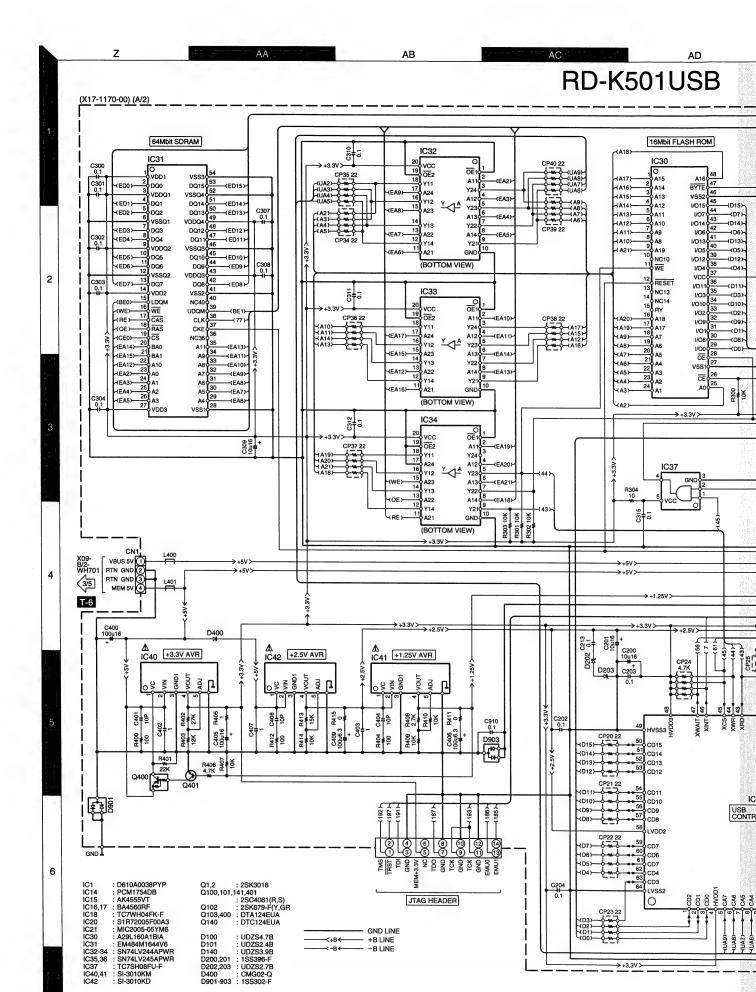


**CAUTION:** For continued safety, replace safety critical components only with manufacturer's recommended parts (refer to parts list).  $\Delta$  indicates safety critical components. For continued protection against risk of fire, replace only with same type and rating fuse(s). To reduce the risk of electric shock, leakage-current or resistance measurements shall be carried out (exposed parts are acceptably insulated from the supply circuit) before the appliance is returned to the customer.

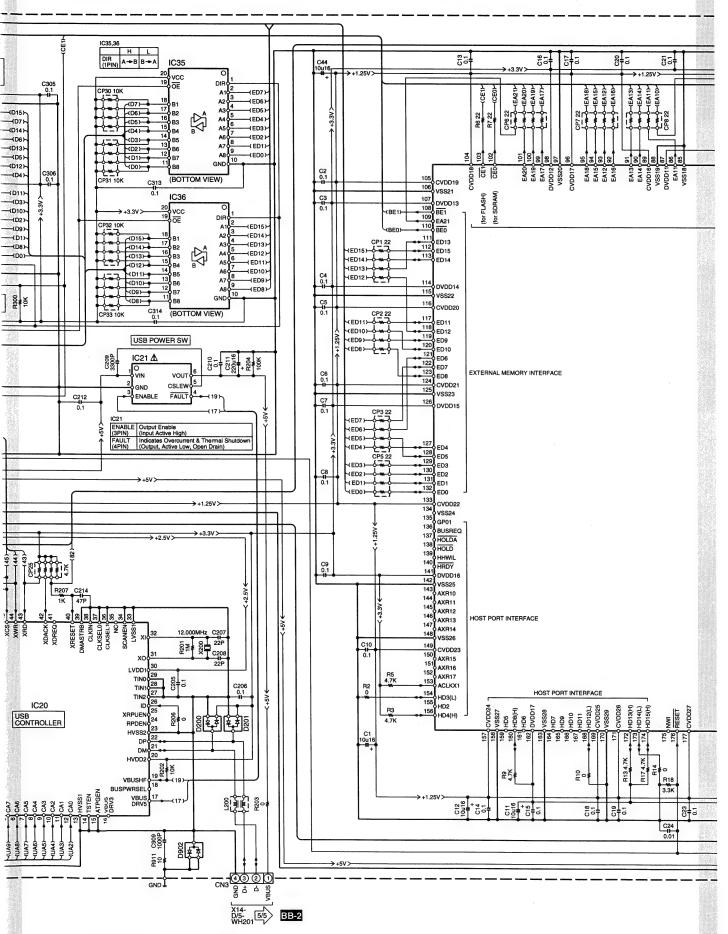
The DC voltage is an actual reading measured with a high impedance type voltmeter with no signal input. The measurement value may vary depending on the measuring instruments used or on the product.

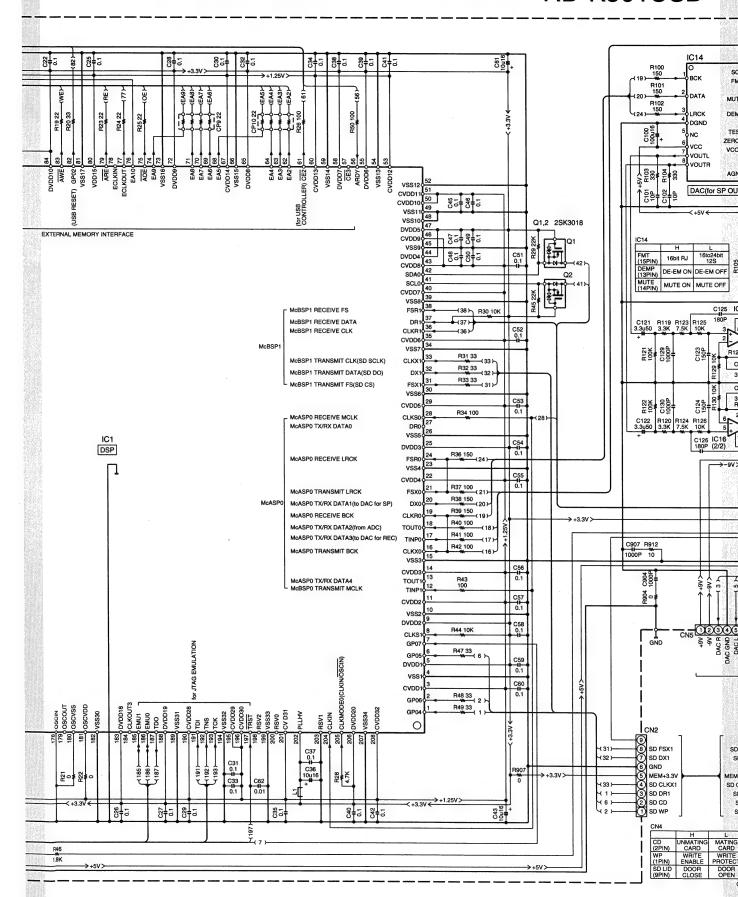
YES 4.7 NO

0.22 YES 2200P



IC40,41 IC42

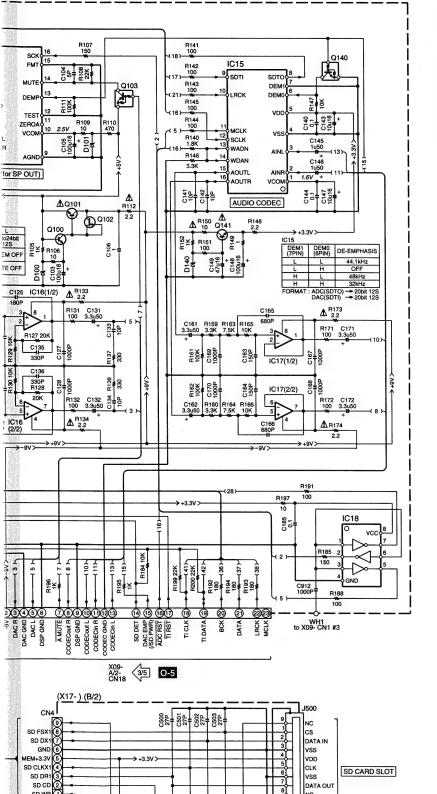




4

6

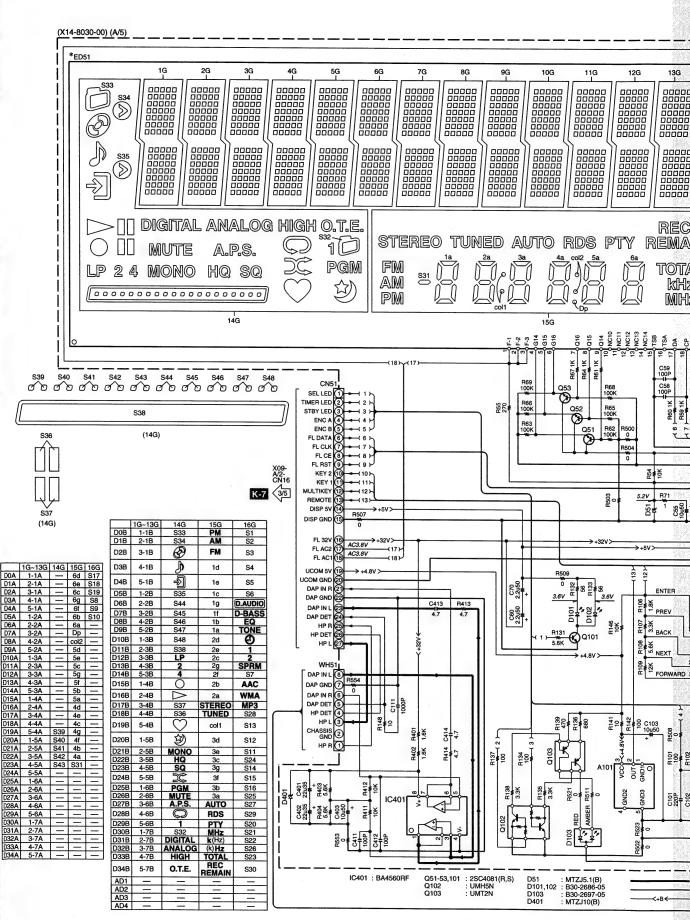
### RD-K501USB

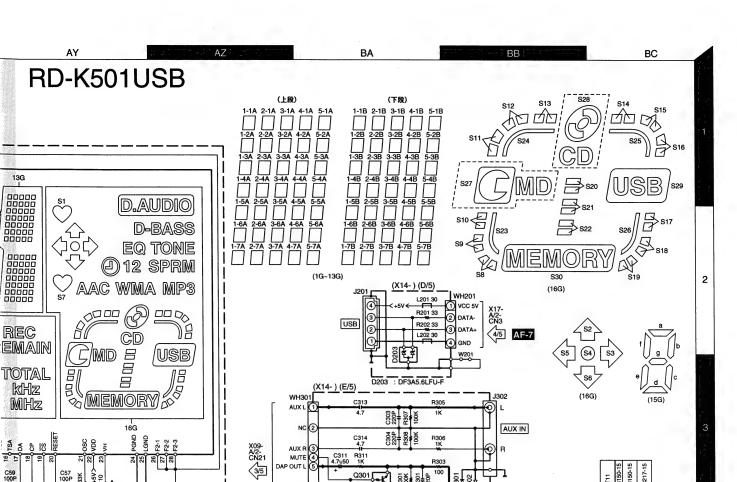


**CAUTION:** For continued safety, replace safety critical components only with manufacturer's recommended parts (refer to parts list).  $\Delta$  indicates safety critical components. For continued protection against risk of fire, replace only with same type and rating fuse(s). To reduce the risk of electric shock, leakage-current or resistance measurements shall be carried out (exposed parts are acceptably insulated from the supply circuit) before the appliance is returned to the customer.

The DC voltage is an actual reading measured with a high impedance type voltmeter with no signal input. The measurement value may vary depending on the measuring instruments used or on the product.

RD-K501 (4/5)





R311

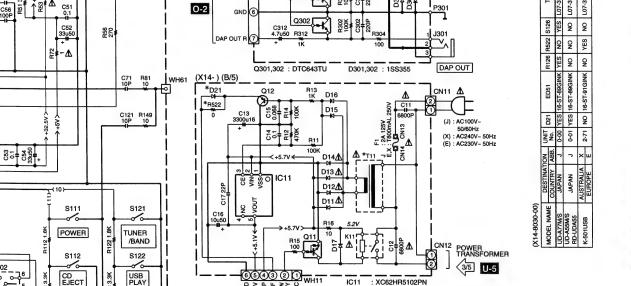
8

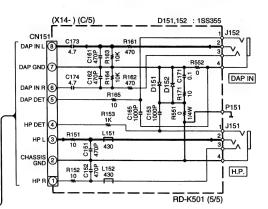
: XC62HB5102PN

: DTC113ZSA : KTA1267-P(Y,G

D11-17,21 : 1SS133

MUT DAP OUT





u GND u+5.5V HELP F.OFF POW POW

X09-A/2-CN17 3/5 O-6

CAUTION: For continued safety, replace safety critical components only with manufacturer's recommended parts (refer to parts list). A indicates safety critical components. For continued protection against risk of fire, replace only with same type and rating fuse(s). To reduce the risk of electric shock, leakage-current or resistance measurements shall be carried out (exposed parts are acceptably insulated from the supply circuit) before the appliance is returned to the customer.

4

6

The DC voltage is an actual reading measured with a high impedance type voltmeter with no signal input. The measurement value may vary depending on the measuring instruments used or on the product.

SIGNAL LINE

GND LINE

Δ

H60 1 H59 1 H58 1 H57 1

R71

ENTER

PREV

BACK

NEXT

S102

MULTI CONTROL

VOLUME

S113

SETUP

CD PLAY

S115

MEM PLAY

S116

SELECTOR

S123

STOP

S124

CD USB OTE

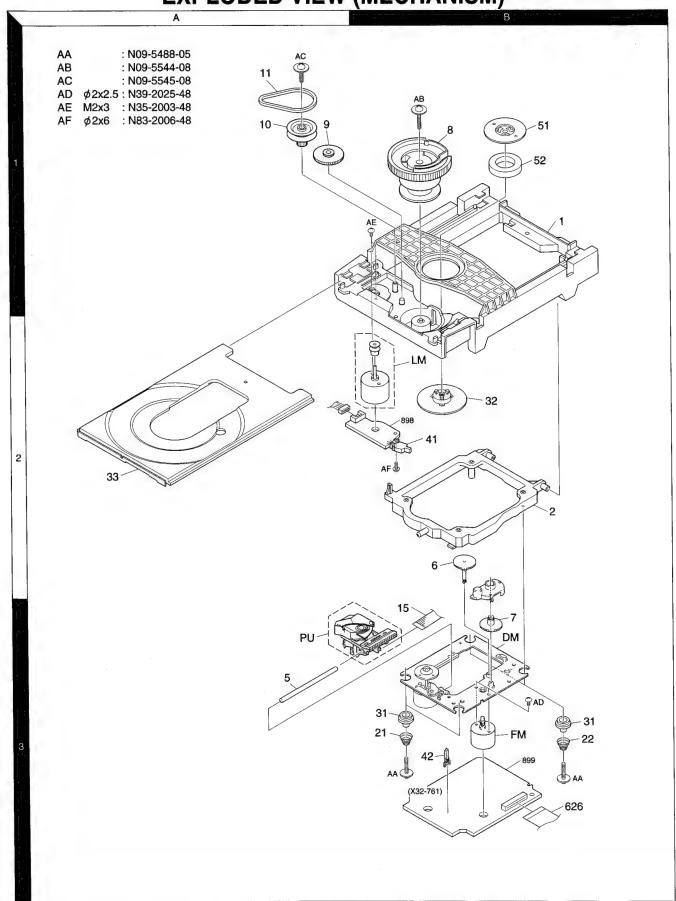
S125 CD MEM OTE

\*S126

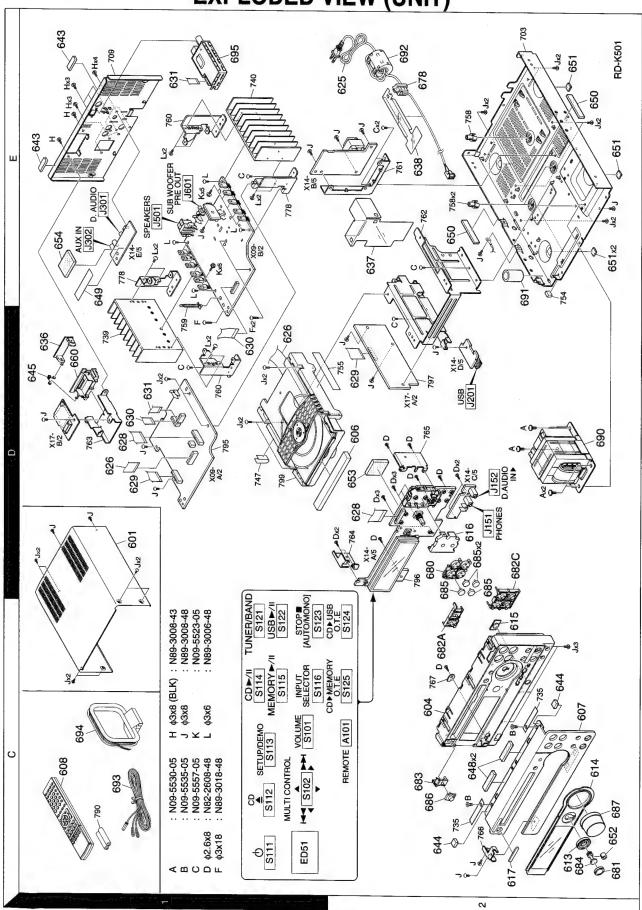
MD EJECT

C55 0050

**EXPLODED VIEW (MECHANISM)** 



**EXPLODED VIEW (UNIT)** 



R: Mexico G: Germany H: Korea

P: Canada E: Europe O: Russia

K: USA T: England X: Australia

L: Scandinavia Y: PX(Far East, Hawaii) Y: AAFES(Europe)

## **PARTS LIST**

| nis.              |
|-------------------|
| ont pas fournis.  |
| No. ne sont<br>t. |
| plied.<br>Parts I |

| 6 | He-<br>marks |  |                                   |             |                |   |  |  |   |  |   |   |  |  |
|---|--------------|--|-----------------------------------|-------------|----------------|---|--|--|---|--|---|---|--|--|
|   | Desti-       |  |                                   |             |                |   |  |  |   |  |   |   |  |  |
|   |              | EW<br>EW<br>EW   |                                   |             |                | 7 Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y                                       | 50WV   | 10WV<br>5.5WV<br>50WV<br>50WV  | 20 A<br>20 W<br>20 K  | ****   | 40°5°   | 10WV<br>10WV<br>50WV  | 50WV<br>50WV<br>50WV   | C<br>50WV                                      |
|   | Description  | TAPTITE SCR<br>TAPTITE SCR<br>TAPTITE SCR  | ENNA                              |             | 22-71)         | 0.010UF<br>0.10UF<br>330UF<br>1000PF<br>22PF                                  | 0.010UF<br>1000PF<br>0.010UF<br>2.2UF<br>0.1UF                               | 100UF<br>0.047F<br>470PF<br>10UF<br>1.0UF                                    | 4.7UF<br>1.0UF<br>680PF<br>4.7UF  | 0.10UF<br>0.22UF<br>0.15UF<br>0.10UF<br>2200PF                               | 1.0UF<br>100PF<br>100UF<br>470PF  | 100UF<br>220UF<br>7.0PF<br>1000PF<br>1.0UF                                    | 22UF<br>0.10UF<br>10UF<br>0.10UF   | 5.0PF<br>470PF<br>2.2UF<br>220PF               |
|   |              | BINDING HEAD TAPTITE SCREW<br>BINDING HEAD TAPTITE SCREW<br>BINDING HEAD TAPTITE SCREW<br>BINDING HEAD TAPTITE SCREW | LEAD WIRE ANTENNA<br>LOOP ANTENNA | TUNER ASSY  | IO (X09-7022-7 | CHIP C<br>CHIP C<br>CHIP C<br>CHIP C<br>CHIP C                                | CHIP C<br>CHIP C<br>CHIP C<br>ELECTRO<br>ELECTRO                             | ELECTRO<br>BACKUP C<br>CHIP C<br>ELECTRO<br>CHIP C                           | CHIP C<br>CHIP C<br>CHIP C<br>CHIP C<br>ELECTRO                               |  | CHIP C<br>CHIP C<br>CHIP C<br>ELECTRO   | ELECTRO<br>ELECTRO<br>CHIP C<br>CHIP C<br>NP-ELEC                             | NP-ELEC<br>CHIP C<br>CHIP C<br>CHIP C<br>CHIP C                              | CHIP C<br>CHIP C<br>ELECTRO                    |
|   | Parts No.    | N82-2608-48<br>N89-3018-48<br>N89-3008-48<br>N89-3006-48   | T90-0877-05<br>T90-0893-05        | W02-4644-05 | AUDIO          | CK73GB1H103K<br>CK73GB1H104K<br>CD04BJ1C331M<br>CK73GB1H102K<br>CC73GCH1H220J | CK73GB1H103K<br>CK73GB1H102K<br>CK73GB1H103K<br>CD04BJ1H2R2M<br>CD04BJ1H2R2M | CD04BJ1A101M<br>C90-5839-05<br>CC73GCH1H471J<br>CD04BJ1H100M<br>CK73GB1A105K | CK73FB0J475K<br>CK73GB1A105K<br>CC73GCH1H681J<br>CK73FB0J475K<br>CD04BJ1H100M | CK73GB1H104K<br>CK73GB1C224K<br>CK73GB1E154K<br>CK73GB1H104K<br>CK73GB1H222K | CK73GB1A105K<br>CC73GCH1H100D<br>CC73GCH1H101J<br>CD04BJ1A101M<br>CC73GCH1H471J | CD04BJ1A101M<br>CD04BJ1A221M<br>CC73GCH1H070D<br>CK73GB1H102K<br>CD04AU1H010M | CD04AU1H220M<br>CK73GB1H104K<br>CK73GB1H104K<br>CD04BJ1H100M<br>CK73GB1H104K | CC73GCH1H050C<br>CC73GCH1H471J<br>CD04BJ1H2R2M |
|   | New<br>Parts |  |                                   | *           |                |   |  |  |   |  |   |   |  |  |
| Г | Add-         |  | ō<br>5<br>5                       | ñ           |                |   |  |  |   |  |   |   |  |  |
|   | Ref. No      | ر جیت  | 693<br>694                        | 969         |                | 02<br>02<br>015<br>016,17   | C18<br>C20<br>C91<br>C92   | C93,94<br>C95<br>C100<br>C101,102<br>C103,104                                | C105,106<br>C109,110<br>C117,118<br>C119,120<br>C121,122                      | C123,124<br>C125,126<br>C127,128<br>C129-132<br>C133,134                     | C135,136<br>C137,138<br>C139,140<br>C141<br>C142,143                            | C145<br>C145<br>C149<br>C153  | C154<br>C351,352<br>C355<br>C356<br>C356<br>C496,497                         | C501,502<br>C503,504<br>C505,506               |

|   | _ |   |
|---|---|---|
| 1 | - | ) |
|   | • |   |

| Re-<br>marks     |            |   |  |   |               |  |  |  |  |   |  |   |  |  |
|------------------|------------|---|--|---|---------------|--|--|--|--|---|--|---|--|--|
| Desti-<br>nation |            |   | шшшш   | ш   |               | ×ш   |  |  |  |   |  | 1411  |  | ш×   |
| Description      | RD-K501USB | METALLIC CABINET<br>SUB PANEL<br>PANEL, CD-SS8-8<br>PANEL<br>REMOTE CONTROL ASSY, RC-F0508E | INSTRUCTION MANUAL,501-ENG<br>INSTRUCTION MANUAL,501-GER<br>INSTRUCTION MANUAL,501-GER<br>INSTRUCTION MANUAL,501-0RA<br>INSTRUCTION MANUAL,501-1TA | INSTRUCTION MANUAL,501-SPA<br>ESCUTCHEON,10JI<br>FRONT CLASS<br>INDICATOR,P/C<br>LENS,4KEY-LENS | KENWOOD BADGE | AC POWER CORD AS ROUND PLU<br>AC POWER CORD EN 2:5A<br>FLAT CABLE, CD-X:09<br>FLAT CABLE, X:09-X:14<br>FLAT CABLE, X:09-X:17 | FLAT CABLE, X09-X09<br>FLAT CABLE, TUNER-X09 | COVER, SD<br>INSULATING BOARD, X14<br>INSULATING BOARD, AC | NON-WOVEN FABRIC(30X10MM) CUSHION AUX TORSION COIL SPRING, SD SOFT TAPE (40X9X2) CUSHION | CUSHION<br>CUSHION, COUSHION, DISPLAY<br>CUSHION, DISPLAY                       | WIRE BAND<br>HOLDER,SD<br>POWER CORD BUSHING | KNOB,4KEY-CLEA<br>KNOB,10JI-KEYT<br>KNOB,2IVER-AL<br>KNOB,POWEE-BAS<br>KNOB,10JI-VIKU | KEY TOP,4KEY-KEYT<br>KEY TOP,POWER-KEY<br>KNOB,VOL | POWER TRANSFORMER<br>POWER TRANSFORMER<br>FERRITE CORF |
| Parts No.        |            | A01-3965-01<br>A22-1923-11<br>A29-1262-03<br>A60-2480-01<br>A70-1715-05                     | B60-5655-00<br>B60-5656-00<br>B60-5657-00<br>B60-5658-00<br>B60-5659-00  | B60-5668-00<br>B07-2737-04<br>B10-5606-02<br>B12-1403-04<br>B19-1679-03                         | B43-0338-04   | E30-7330-05+<br>E30-7368-05<br>E35-3912-05<br>E35-3914-15<br>E35-3915-05   | E35-3916-05<br>E35-3911-05                   | F19-1148-03<br>F20-3632-03<br>F20-3633-13                  | G10-1435-04<br>G11-2991-04<br>G01-4381-04<br>G11-0155-14<br>G11-2974-04                  | G11-2979-14<br>G11-2986-04<br>G11-2988-04<br>G11-2989-04<br>G11-2990-04         | J61-0307-05<br>J19-6464-13<br>J42-0349-05    | K29-8515-02<br>K29-8516-04<br>K29-8517-12<br>K29-8518-04<br>K29-8519-03               | K29-8551-03<br>K29-8552-04<br>K29-8554-03          | L07-3345-05<br>L07-3349-05                             |
| New<br>Parts     |            | ****  | ****   | ****  |               | * ***  | **   | ***  | **   | ****  | *  | ****  | ***  | ***  |
| Add-             |            | 58885   |  | 2222  | 20            | 26<br>26<br>10,20<br>10,20   | 10,1E  | 무원분  | #2 <b>5</b> 2#   | 15<br>15<br>15<br>15<br>15<br>15<br>15<br>15<br>15<br>15<br>15<br>15<br>15<br>1 | 5#   | 220,23<br>20,23<br>20,23  | ನ್ನಬ್ಬ   | 88%  |
| Ref. No          |            | 601<br>604<br>606<br>607<br>608   |  | 613<br>614<br>615   | 617           | 625<br>625<br>626<br>628<br>629  | 630<br>631                                   | 636<br>637<br>638  | 643<br>644<br>645<br>648<br>649  | 650<br>651<br>653<br>653<br>654   | -<br>660<br>678                              | 680<br>681<br>683<br>683  | 685<br>686<br>687                                  | 069  |

C: China I: Malaysia V: China/Shanghai) M: Other Areas  $\Delta$  indicates safety critical components . R: Mexico G: Germany H: Korea P: Canada E: Europe Q: Russia K: USA T: England X: Australia L: Scandinavia V: PX(Far East, Hawaii) V: AAFES(Europe)

### **PARTS LIST**

| Desti- Re-  |  |  |   |  |  |   |  |  |  |  |   |   |              |
|-------------|--|--|---|--|--|---|--|--|--|--|---|---|--------------|
|             | SOWV   |  | 7P,<br>3P,<br>3P,   | 15P,<br>5P,<br>8LK   |  | (Z  | 1/10W<br>1/10W<br>1/10W<br>1/10W   | 1/10W<br>1/10W<br>1/10W<br>1/10W   | 1/10W<br>1/10W<br>1/10W<br>1/10W   | 1/10W<br>1/10W<br>1/10W<br>1/10W   | 1/10W<br>1/10W<br>1/10W<br>1/10W  | 1/10W<br>1/10W<br>1/10W<br>1/10W  | 1/10W        |
| _           | م حد ت   | エコエコ   | 1.25M<br>1.25M<br>1.25M<br>1.25M  | 1MM, 1<br>1MM, 1<br>PRED   |  | 768KH   | 77777  | 77777  | רררר   | 7777   | ררפרר   | 77777   | 7            |
| Description | 22PF<br>10PF<br>22PF<br>0.10UF   | 0.10UF<br>22PF<br>0.10UF<br>22PF                               | CONNECTOR, 1MM, 7P,<br>CONNECTOR, 1.25MM,<br>CONNECTOR, 1MM, 23P,<br>CONNECTOR, 1MM, 27P,<br>CONNECTOR, 1MM, 23P, | FLAT CABLE CONNECTOR, 1MM,15P,<br>FLAT CABLE CONNECTOR, 1MM, 15P,<br>LOCK TERMINAL BOARD,4P RED/BLK<br>PIN JACK,1P,BLK | W#W  | CRYSTAL RESONATOR(32.768KHZ)<br>RESONATOR (10MHZ) | 1.0M<br>220<br>3.9K<br>4.7K<br>100K  | 100<br>4.7K<br>4.7K<br>100K<br>7.7M  | 1.00 <b>K</b>  | 001<br>477<br>4001<br>001  | 741<br>700<br>79.6<br>79.6<br>00  | 13.00<br>13.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00<br>10.00 | 47K          |
|             | OHIP COHIP C |  | ELAT CABLE<br>FLAT CABLE<br>FLAT CABLE<br>FLAT CABLE  | FLAT CABLE (FLAT CABLE (LOCK TERMINPIN JACK, 1P.)  | CHIP FERRITE<br>FERRITE CORE<br>CHIP FERRITE | CRYSTAL RESPENDENTOR                              | OCHED PROPERTY OF THE PROPERTY | OH O                                     | OH O                                     | OCHIPP<br>CHIPP<br>CHIPP<br>RR RR<br>RR RR<br>RR RR                          | OCHEP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP<br>CHIPP | OHIP<br>OHIP<br>OHIP<br>RARRA<br>RARRA  | CHIP R       |
| Parts No.   | CC73GCH1H220J<br>CC73GCH1H100D<br>CC73GCH1H220J<br>CK73GB1H104K<br>CD04BJ1H100M  | CC73GB1H104K<br>CC73GCH1H220J<br>CK73GB1H104K<br>CC73GCH1H220J | E41-1832-05<br>E41-1425-05<br>E41-1848-05<br>E41-1852-05<br>E41-1848-05   | E41-1840-05<br>E41-1840-05<br>E70-1027-05<br>E63-1146-15   | L92-0810-05<br>L92-0017-05<br>L92-0810-05    | L77-2173-15<br>L78-0754-05                        | RK73GB2A105J<br>RK73GB2A221J<br>RK73GB2A392J<br>RK73GB2A472J<br>RK73GB2A104J   | RK73GB2A101J<br>RK73GB2A472J<br>RK73GB2A472J<br>RK73GB2A104J<br>RK73GB2A104J | RK73GB2A104J<br>RK73GB2A102J<br>RK73GB2A820J<br>RK73GB2A104J<br>RK73GB2A101J | RK73GB2A101J<br>RK73GB2A470J<br>RK73GB2A104J<br>RK73GB2A473J<br>RK73GB2A101J | RK73GB2A473J<br>RK73GB2A101J<br>RK73GB2A102J<br>RK73GB2A392J<br>RK73GB2A101J  | RK73GB2A102J<br>RK73GB2A332J<br>RK73GB2A101J<br>RK73GB2A332J<br>RK73GB2A101J  | RK73GB2A473J |
| Parts       | 55555  | 5555   | ** *  | ***  | 999  | 77  | ***  | ****   | ***  | 英英英英   | 英英英英英   | <b>英英英英英</b>  | 풒            |
| ress P      |  |  | -   |  |  |   |  |  |  |  |   |   |              |
| Ref. No     | C735<br>C736<br>C737<br>C740<br>C741,742   | C751-754<br>C755<br>C756<br>C756                               | 20000<br>214 911<br>8   | CN19<br>CN501<br>J501<br>J601  | -11 -13<br>-14<br>-15 ,16                    | (11<br>(12  | 15 25 25 75<br>4, 75   | 711 -14<br>716<br>719<br>720   | 72.1<br>72.2<br>72.3<br>72.5<br>72.7   | 132 -34<br>136 ,37<br>138<br>141   | 147<br>148<br>149 ,50<br>151  | 153<br>154<br>156<br>157,58   | 61           |

C: China I: Malaysia V: China(Shanghai) M: China(Shanghai) M: Other Areas  $\Delta$  indicates safety critical components .

R: Mexico G: Germany H: Korea

P: Canada E: Europe O: Russia

K: USA T: England X: Australia

L: Scandinavia Y: PX[Far East,Hawaii] Y: AAFES(Europe)

## **PARTS LIST**

|                              | sont pas fournis.                                  |                               |
|------------------------------|--|-------------------------------|
| upplied.                     | non mentionnes dans le Parts No. ne sont pas fourn | nt geliefert.                 |
| t Parts No. are not supplied | mentionnes dans                                    | arts No. werden nicht geliefe |

| Re-<br>marks     |  |  |  |  |  |  |  |  |  |  |                              |
|------------------|--|--|--|--|--|--|--|--|--|--|------------------------------|
| Desti-<br>nation |  |  |  |  |  |  |  |  |  |  |                              |
|                  | 1/10W<br>1/4W<br>1/10W<br>1/10W  | W01/1<br>W01/1<br>W01/1<br>W01/1   | W01/1<br>W01/1<br>W01/1  | 1/10W<br>1/10W<br>1/10W<br>1/10W   | 1/10W<br>1/10W<br>1/10W<br>1/10W   | 1/10W<br>1/10W<br>1/10W<br>W01/1   | 1/10W<br>2W<br>1/10W<br>1/10W  | 1W<br>1/10W<br>2W<br>1/10W<br>1/10W  | 1/10W<br>1/4W<br>1/4W<br>1/4W  | 01/10W<br>01/10W<br>01/10W<br>01/10W   | 2W<br>1/10W<br>1/10W         |
|                  | הררר   | רררר   | 7777   | 7777   | 7777   | 7777   | ררריי  | 7777   | 7777   | ררררר  | יירי                         |
| Description      | 2.2<br>0.0<br>0.0<br>0.0<br>0.0  | 0.00<br>0.00<br>0.05<br>0.00<br>0.00   | 0.0<br>130<br>1.0K<br>160  | 620<br>620<br>100<br>2K<br>12K   | 2.2<br>150<br>4.70<br>7.74   | 270<br>270<br>270<br>270<br>1.3 <b>K</b>                                     | 5.6K<br>10<br>0.33<br>2.4K<br>1.0K   | 4.7<br>4.7K<br>10<br>4.7K<br>4.7K  | 57.4<br>7.7.0<br>90<br>90<br>90  | 8.2K<br>10<br>10<br>10<br>10<br>10   | 390<br>47K<br>47K            |
|                  | 2000<br>7222<br>7222<br>7222<br>7222<br>7222<br>7222<br>7222                 | OOOOO<br>THE THE<br>THE THE<br>THE THE                                       | 2000<br>2000<br>2000<br>2000<br>2000<br>2000<br>2000<br>200                  | TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT<br>TTTT | 20000<br>T T T T T T T T T T T T T T T T T T                                 | OOOOO<br>TOTO<br>TOTO<br>TOTO<br>TOTO<br>TOTO<br>TOTO<br>TO                  | CHIP R<br>CHIP R<br>FL-PROOF RS<br>CHIP R<br>CHIP R                          | FL-PROOF RS<br>CHIP R<br>FL-PROOF RS<br>CHIP R<br>CHIP R                     | AR SHOWN   |  | FL-PROOF RS<br>CHIP R        |
| Parts No.        | RK73GB2A222J<br>RK73EB2E000J<br>RK73EB2E000J<br>RK73GB2A000J<br>RK73GB2A000J | RK73GB2A000J<br>RK73GB2A000J<br>RK73GB2A000J<br>RK73GB2A752J<br>RK73GB2A000J | RK73GB2A000J<br>RK73GB2A131J<br>RK73GB2A473J<br>RK73GB2A102J<br>RK73GB2A102J | RK73GB2A101J<br>RK73GB2A621J<br>RK73GB2A101J<br>RK73GB2A683J<br>RK73GB2A683J   | RK73GB2A222J<br>RK73GB2A151J<br>RK73GB2A222J<br>RK73GB2A471J<br>RK73GB2A472J | RK73GB2A101J<br>RK73GB2A271J<br>RK73GB2A102J<br>RK73GB2A271J<br>RK73GB2A132J | RK73GB2A562J<br>RK73GB2A100J<br>RS14KB3DR33J<br>RK73GB2A242J<br>RK73GB2A102J | RS14KB3A4R7J<br>RK73GB2A472J<br>RS14KB3D100J<br>RK73GB2A472J<br>RK73GB2A473J | RK73GB2A103J<br>RK73GB2A473J<br>RD14NB2E4R7J<br>RD14NB2E100J<br>RK73GB2A103J | RK73GB2A100J<br>RK73GB2A4R7J<br>RK73GB2A4R7J<br>RK73GB2A100J<br>RK73GB2A683J<br>RK73GB2A100J | RS14KB3D391J<br>RK73GB2A473J |
| New<br>Parts     |  |  |  |  |  |  |  |  |  |  |                              |
| Add-             |  |  |  |  |  |  |  |  |  |  |                              |
| Ref. No          | R416<br>R452<br>R454,455<br>R471,472<br>R471-477                             | R479<br>R481,482<br>R484-486<br>R487<br>R487                                 | R495-497<br>R501,502<br>R503,504<br>R505,506<br>R505,508                     | R513,514<br>R516<br>R517,518<br>R519,520<br>R519,520   | R523,524<br>R525,526<br>R527,528<br>R529,530<br>R529,530                     | R533,534<br>R537,538<br>R539,540<br>R541,542<br>R543,544                     | R545,546<br>R547-550<br>R551-554<br>R555,556<br>R555,558                     | R561,562<br>R563,564<br>R565<br>R566<br>R566                                 | R569<br>R570,571<br>R572<br>R573<br>R573                                     | R575<br>R576<br>R578<br>R579<br>R581,582<br>R581,  | R601,602<br>R603,604         |

| ı | ı | ı |   | ١ |
|---|---|---|---|---|
| ı | ı | ŗ | i | 1 |
| 1 | ٦ | ۹ | ı | ı |
|   |   |   |   |   |

| Re-         | 2     |  |  |  |  |  |  |  |  |   |                              |
|-------------|---|--|--|--|--|--|--|--|--|---|------------------------------|
| Desti-      | nation                                      |  |  |  |  |  |  |  |  |   |                              |
|             | 1/10W<br>1/10W<br>1/10W<br>1/10W            | 1/10W<br>1/10W<br>1/10W<br>1/10W   | 1/10W<br>1/10W<br>1/10W<br>1/10W   | 1/10W<br>1/10W<br>1/10W<br>1/10W   | 1/10W<br>1/10W<br>1/10W<br>1/10W   | 1/10W<br>1/10W<br>1/10W<br>1/10W   | 1/10W<br>1/10W<br>1/10W<br>1/10W   | 1/10W<br>1/10W<br>1/10W<br>1/10W   | 1/10W<br>1/10W<br>1/10W<br>1/10W   | 222222<br>2000<br>2000<br>2000<br>2000<br>2000<br>2000<br>2   | 1/10W                        |
|             | 2222  | 77777  | ~~~~   | 7777   | 77777  | 7777   | 7777   | 77777  | 7777   | 777777  | 77                           |
| Description | 3.3.4<br>00.<br>100.<br>100.<br>100.        | 64.0.1.<br>64.0.1.<br>64.0.1.  | 5.4.4.6.8.7.8.7.8.7.8.7.8.7.8.7.8.7.8.7.8.7.8                                | 9.38 6.33 6.33 6.33 6.33 6.33 6.33 6.33 6                                    | 7.5.<br>1.0.<br>1.0.<br>1.0.<br>1.0.<br>1.0.<br>1.0.<br>1.0.<br>1            | <u> </u>   | ± 2.57 7.52 7.52 7.52 7.52 7.52 7.52 7.52                                    | 100K<br>15K<br>100<br>0.0  | <u>850050</u>  | 7.7.<br>7.57.<br>7.57.<br>7.57.<br>7.57.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7.50.<br>7 | 20X                          |
|             | 00000<br>00000<br>00000<br>000000<br>000000 | ######################################                                       | 00000<br>00000<br>000000<br>000000   |  | 99999<br>77777<br>8888   | 00000<br>00000<br>00000<br>00000   |  | 20000<br>77777<br>77777<br>88888   | 00000<br>00000<br>00000<br>000000  |   | OHP R                        |
| Dorde Mo    | 382A1<br>382A1<br>382A1<br>382A1            | RK73GB2A101J<br>RK73GB2A102J<br>RK73GB2A104J<br>RK73GB2A1R0J<br>RK73GB2A1R0J | RK73GB2A103J<br>RK73GB2A102J<br>RK73GB2A161J<br>RK73GB2A161J<br>RK73GB2A562J | RK73GB2A682J<br>RK73GB2A331J<br>RK73GB2A102J<br>RK73GB2A100J<br>RK73GB2A332J | RK73GB2A102J<br>RK73GB2A152J<br>RK73GB2A181J<br>RK73GB2A222J<br>RK73GB2A102J | RK73GB2A103J<br>RK73GB2A102J<br>RK73GB2A183J<br>RK73GB2A102J<br>RK73GB2A183J | RK73GB2A113J<br>RK73GB2A102J<br>RK73GB2A103J<br>RK73GB2A153J<br>RK73GB2A222J | RK73GB2A104J<br>RK73GB2A223J<br>RK73GB2A153J<br>RK73GB2A101J<br>RK73GB2A000J | RK73GB2A151J<br>RK73GB2A151J<br>RK73GB2A101J<br>RK73GB2A151J<br>RK73GB2A101J | RK73GB2A72J<br>RK73GB2A752J<br>RK73GB2A103J<br>RK73GB2A103J<br>RK73GB2A13J<br>RK73GB2A154J<br>RK73GB2A154J<br>RK73GB2A154J  | RK73GB2A333J<br>RK73GB2A203J |
| New         | Parts                                       |  |  |  |  |  |  |  |  |   |                              |
| Add-        | ress  |  |  |  |  |  |  |  |  |   |                              |
| 1 3         | R62 -65<br>R66<br>R67<br>R70,71<br>R72,73   | R76 -86<br>R91<br>R92<br>R93 ,94<br>R95                                      | R96<br>R97<br>R100<br>R121,122<br>R127,128                                   | R129,130<br>R131,132<br>R133-135<br>R136<br>R137                             | R138<br>R139<br>R140<br>R141,142   | R145,146<br>R152<br>R154<br>R154<br>R156,157                                 | R159<br>R160<br>R201,202<br>R203,204<br>R205,206                             | R213,214<br>R215,216<br>R217,218<br>R219,220<br>R310                         | R353<br>R355<br>R357<br>R358<br>R358<br>R360,361                             | R363<br>R364<br>R401,402<br>R404,405<br>R409<br>R410  | R412<br>R413                 |

I: Malaysia R : Mexico G : Germany H : Korea P: Canada E: Europe O: Russia K:USA T:England X:Australia L: Scandinavia Y: PX(Far East, Hawaii) Y: AAFES(Europe)

### **PARTS LIST**

| Re-<br>marks     |  |  |  |   |  |   |                                  |   |  |   |   |                                     |
|------------------|--|--|--|---|--|---|----------------------------------|---|--|---|---|-------------------------------------|
| Desti-<br>nation |  |  |  |   |  |   |                                  |   |  |   |   |                                     |
|                  | 1/10W<br>1/10W<br>1/10W<br>1/10W   | 1/10W<br>1/10W<br>1/10W<br>1/10W   | 1/4W<br>1/10W<br>1/10W<br>1/10W  | 1/10W<br>1/10W<br>1/10W<br>1/10W  | 2W<br>1/10W<br>1/10W<br>1/10W  | 1/10W<br>1/10W<br>1/10W   |                                  |   |  |   |   |                                     |
| _                | 7777   | 777 <b>7</b> 7   | 7777   | 7777  | 7777   | J<br>J<br>SHESISTOR   |                                  |   |  |   |   |                                     |
| Description      | 882 <u></u><br>882 <u></u><br>882  | <u> </u>   | 1.4<br>100<br>100<br>22%   | \$6.54<br>\$70<br>\$70<br>\$10<br>\$10<br>\$10<br>\$10<br>\$10<br>\$10<br>\$10<br>\$10<br>\$10<br>\$1 | 021<br>150<br>150<br>620<br>620  | 0.0<br>0.0<br>0.0<br>NABLE RES                                  | <u>}</u>                         |   |  |   |   |                                     |
|                  | A R R R R R R  | ######################################                                       | 88555<br>777<br>888<br>888   | HHHH<br>HHHH<br>HHHH<br>HHHHH   | FL-PROOF RS<br>CHIP R<br>CHIP R<br>CHIP R                                    | CHIP R 0.0<br>CHIP R 0.0<br>CHIP R 0.0<br>SEMI FIXED VARIABLE F | MAGNETIC RELAY<br>MAGNETIC RELAY | DIODE<br>DIODE<br>DIODE<br>ZENER DIODE<br>ZENER DIODE | ZENER DIODE<br>ZENER DIODE<br>ZENER DIODE<br>DIODE   | DIODE<br>ZENER DIODE<br>ZENER DIODE<br>DIODE              | DIODE<br>DIODE<br>DIODE<br>DIODE  | ZENER DIODE<br>ZENER DIODE<br>DIODE |
| Parts No.        | RK73GB2A681J<br>RK73GB2A201J<br>RK73GB2A102J<br>RK73GB2A183J<br>RK73GB2A113J | RK73GB2A102J<br>RK73GB2A183J<br>RK73GB2A102J<br>RK73GB2A113J<br>RK73GB2A102J | RD14NB2E1R0J<br>RD14NB2E472J<br>RK73GB2A101J<br>RK73GB2A000J<br>RK73GB2A223J | RK73GB2A103J<br>RK73GB2A182J<br>RK73GB2A103J<br>RK73GB2A471J<br>RD14NB2E180J                          | RS14KB3D121J<br>RK73GB2A151J<br>RK73GB2A100J<br>RK73GB2A151J<br>RK73GB2A621J | RK73GB2A000J<br>RK73GB2A000J<br>RK73GB2A000J<br>R32-0151-05     | S76-0098-05<br>S76-0098-05       | 1SS402-F<br>1SS355<br>1SS133<br>UDZS2.7B<br>UDZS3.9B  | UDZS2.7B<br>UDZS8.2B<br>UDZS10B<br>DAP202U<br>1SS133 | 1SS355<br>UDZS4.7B<br>UDZS3.9B<br>1SS355<br>S5688B(TPB5)Q | TS6P03G-B<br>S5688B(TPB5)Q<br>TS4B03G-B1<br>S5688B(TPB5)Q<br>TS4B03G-B1 | UDZS16B<br>UDZS18B<br>1SS355        |
| Parts            |  |  |  |   |  | *   |                                  |   |  |   |   |                                     |
| Add-             |  |  |  |   |  |   |                                  |   |  |   |   |                                     |
| Ref. No          | R619<br>R625<br>R626<br>R627<br>R627   | R629<br>R630<br>R631<br>R632<br>R633   | R701<br>R702<br>R703<br>R704,705<br>R704,705                                 | R716,717<br>R718<br>R719<br>R720<br>R721  | R722<br>R723<br>R724<br>R725<br>R725   | R731,732<br>R801-804<br>R806-813<br>VR501,502                   | K501<br>K601                     | D91<br>D92<br>D93<br>D102<br>D141,142                 | D151<br>D501<br>D502<br>D505<br>D505                 | D507<br>D508<br>D602<br>D603,604<br>D701                  | D702<br>D703<br>D704<br>D705-708<br>D709                                | D710<br>D711<br>D712                |

## **PARTS LIST**

P: Canada E: Europe O: Russia

L: Scandinavia Y: PX(Far East, Hawaii) Y: AAFES(Europe)

| is. |  |
|-----|--|
|     |  |
|     |  |
|     |  |
|     |  |
| 5   |  |
|     |  |
|     |  |
|     |  |
| -   |  |
|     |  |
| 2   |  |
|     |  |
|     |  |
| 20  |  |
|     |  |
| _   |  |
|     |  |
|     |  |
|     |  |
|     |  |

|   | Re-<br>marks     |   |   |   |   | ***   | -  |   |   |  |  |  |  |
|---|------------------|---|---|---|---|---|--|---|---|--|--|--|--|
|   | Desti-<br>nation |   |   |   |   |   |  |   |   |  |  |  |  |
|   |                  | K<br>K<br>16WV  | XXLXJ<br>VW   | K<br>16WV<br>16WV<br>D  | 6.3WV   | 3WV   |  |   |   | 1/16W<br>1/16W<br>1/16W<br>1/16W   | 1/16W<br>1/10W<br>1/10W<br>1/10W   | 1/10W<br>1/10W<br>1/10W<br>1/10W   | 1/10W<br>1/10W                               |
| l |                  | <b>⊼</b> ⊼ <del>2</del>   |   | スポスなワ   | ⊼ರ್ಹಲ್ಲಿಸ   | كددق  | XXX  | 10.   | MHZ<br>MHZ  |  | 7777   | 7777   | 227  |
|   | Description      | 0.10UF<br>1000PF<br>10UF<br>0.10UF<br>22PF                                    | 3300PF<br>0.10UF<br>220UF<br>0.10UF<br>47PF                                   | 0.10UF<br>10UF<br>0.10UF<br>100UF   | 1.00F<br>100UF<br>1.00UF  | 10PF<br>100UF<br>27PF<br>470PF<br>1000PF  | 1000PF<br>1000PF<br>0.10UF                   | ONNECTOR<br>),SD CARD SI                          | E,300HM,100P<br>E,300HM,100P<br>ONATOR(12.0   | 8888<br>7.47<br>701  | 22<br>0.0<br>77,4<br>22<br>23  | 4.0.4.0<br>7.0.4.<br>7.0.4.  | 33.3K  |
|   |                  |   |   |   |   |   | CHP C  | FLAT CABLE CONNECTOR<br>JACK(OTHERS),SD CARD SLOT | FERRITE CORE,300HM,100MHZ<br>LINE FILTER<br>FERRITE CORE,300HM,100MHZ<br>CRYSTAL RESONATOR(12.0MHZ) | CHIP-COM<br>CHIP-COM<br>CHIP-COM<br>CHIP-COM                                 | CHIP-COM<br>CHIP R<br>CHIP R<br>CHIP R                                       | OH PP                                    | SH PH    |
|   | Parts No.        | CK73GB1H104K<br>CK73GB1H102K<br>CE32BJ1C100M<br>CK73GB1H104K<br>CC73GCH1H220J | CK73GB1H332K<br>CK73GB1H104K<br>CE32BM1C221M<br>CK73GB1H104K<br>CC73GCH1H470J | CK73GB1H104K<br>CE32BJ1C100M<br>CK73GB1H104K<br>CE32BJ1C101M<br>CC73GCH1H100D | CK73GB1A105K<br>CC73GCH1H100D<br>CE32BJ1C101M<br>CE32BC0J101M<br>CK73GB1A105K | CC73GCH1H100D<br>CE32BC0J101M<br>CC73GCH1H270J<br>CC73GCH1H471J<br>CK73GB1H102K | CK73GB1H102K<br>CK73GB1H102K<br>CK73GB1H104K | E41-1311-05<br>E68-0025-05                        | L92-0574-05<br>L79-1308-05<br>L92-0574-05<br>L77-2464-05  | RK74GB1J220J<br>RK74GB1J220J<br>RK74GB1J220J<br>RK74GB1J472J<br>RK74GB1J103J | RK74GB1J220J<br>RK73GB2A000J<br>RK73GB2A472J<br>RK73GB2A472J<br>RK73GB2A22DJ | RK73GB2A472J<br>RK73GB2A000J<br>RK73GB2A472J<br>RK73GB2A000J<br>RK73GB2A472J | RK73GB2A332J<br>RK73GB2A220J<br>RK73GB2A330J |
|   | New<br>Parts     |   |   |   | *   | *   |  | *   | *   | ***************************************                                      | -  |  |  |
|   | Add-             |   |   |   |   |   |  |   |   |  |  |  |  |
|   | Ref. No          | C185<br>C192<br>C200,201<br>C202-206<br>C207,208                              | C209<br>C210<br>C211<br>C212,213<br>C214                                      | C300-308<br>C309<br>C310-315<br>C400  | C402,403<br>C404<br>C405<br>C406<br>C406                                      | C408<br>C409<br>C500-503<br>C901  | C907<br>C909<br>C910                         | CN5<br>J500                                       | L1<br>L200<br>L400,401<br>X200  | CP1 -3<br>CP5 -10<br>CP20-23<br>CP24,25<br>CP30-33                           | CP34-40<br>R2<br>R3<br>R5<br>R6 ,7   | R9<br>R13<br>R17<br>R17  | R18<br>R19<br>R20                            |

| )   | Re-<br>marks     |   |   |                    |                         |             |  |  |   |  |  |   |  |  |               |
|---|------------------|---|---|--------------------|-------------------------|-------------|--|--|---|--|--|---|--|--|---------------|
|   | Desti-<br>nation |   | _   |                    |                         |             |  |  |   |  |  |   |  | 1004-11  |               |
|   |                  | TUBE  |   |                    |                         | ()(         | 16WV<br>74<br>74<br>74   | 7<br>16WV<br>7<br>16WV   | 16WV<br>16WV<br>D<br>16WV   | C<br>16WV<br>50WV  | 2×2×0  | 740<br>6WV  | 50WV<br>16WV<br>16WV<br>50WV   | 2000<br>2000   |               |
|   | Description      | ZENER DIODE<br>FLUORESCENT INDICATOR TI<br>ANALOGUE IC<br>ANALOGUE IC<br>DIGITAL TRANSISTOR | STOR  | ISISTOR            | ELECTRIC CIRCUIT MODULE | (17-1170-00 | 100F<br>0.10UF<br>10UF<br>0.10UF   | 0.10UF<br>10UF<br>10UF<br>0.10UF   | 100F<br>0.010UF<br>100UF<br>100UF   | 5.0PF<br>100UF<br>1.0UF<br>3.3UF<br>150PF                                      | 180PF<br>1000PF<br>3.3UF<br>10PF   | 330PF<br>0.10UF<br>10UF<br>0.10UF   | 1.00F<br>100UF<br>47UF<br>3.3UF  | 150PF<br>680PF<br>1000PF<br>1000PF<br>3.3UF  |               |
|   |                  | ZENER DIODE<br>FLUORESCEN<br>ANALOGUE IC<br>ANALOGUE IC<br>DIGITAL TRAN                     | TRANSISTOR<br>TRANSISTOR<br>TRANSISTOR<br>TRANSISTOR<br>DUAL TRANSISTOR | DIGITAL TRANSISTOR | ELECTRIC CIF            | AUDIO (X17  | #####<br>####<br>#####<br>#####  |  |   | 22222<br>22222<br>22222  | 2<br>2<br>2<br>2<br>2<br>3<br>3<br>3<br>3<br>3<br>3<br>3<br>3<br>3<br>3<br>3<br>3<br>3<br>3<br>3 | 25<br>25<br>25<br>25<br>25<br>25<br>25<br>25<br>25<br>25<br>25<br>25<br>25<br>2 | ######<br>######<br>########################                                 | ONE CONTROCTED CONTROC |               |
| leile ohne <b>Parts No.</b> werden nicht geliefert. | Parts No.        | MTZJ10(B)<br>16-ST-91GINK<br>XC62HR5102PN<br>BA4560RF<br>DTC113ZSA                          | KTA1267-P(Y,G<br>2SC4081(R,S)<br>2SC4081(R,S)<br>UMH5N<br>UMT2N         | DTC643TU           | W02-4648-05             | MEMORY      | CE32BJ1C100M<br>CK73GB1H104K<br>CE32BJ1C100M<br>CK73GB1H104K<br>CK73GB1H104K | CK73GB1H104K<br>CE32BJ1C100M<br>CK73GB1H104K<br>CE32BJ1C100M<br>CK73GB1H104K | CE32BJ1C100M<br>CK73GB1H103K<br>CE32BJ1C101M<br>CC73GCH1H100D<br>CE32BJ1C101M | CC73GCH1H050C<br>CE32BJ1C101M<br>CK73FB1C105K<br>CE32BJ1H3R3M<br>CC73GCH1H151J | CC73GCH1H181J<br>CK73GB1H102K<br>CC73GCH1H102J<br>CE32BJ1H3R3M<br>CC73GCH1H100D                  | CC73GCH1H331J<br>CK73GB1H104K<br>CC73GCH1H100D<br>CE32BJ1C100M<br>CK73GB1H104K  | CE32BJ1H010M<br>CE32BJ1C100M<br>CE32BJ1C101M<br>CE32BJ1C470M<br>CE32BJ1H3R3M | CC73GCH1H151J<br>CC73GCH1H681J<br>CK73GB1H102K<br>CC73GCH1H102J<br>CE32BJ1H3R3M  |               |
| , werde   | New<br>Parts     | *   | <u> </u>  | ۵                  | *                       |             | 00000  | 00000  | 55555   | 88588  | 89898  | 88888   | 88888  | 88888  | $\frac{1}{1}$ |
| arts No   | Add-             |   |   |                    |                         |             |  |  |   |  |  |   |  |  |               |
| lelle onne r  | Ref. No          | D401<br>ED51<br>IC11<br>Q11   | Q12<br>Q51 -53<br>Q101<br>Q102<br>Q103                                  | 0301,302           | A101                    |             | C1<br>C2 -10<br>C11,12<br>C13-23<br>C24                                      | C25 -35<br>C36<br>C37 -42<br>C43 ,44<br>C45 -60                              | C61<br>C62<br>C100<br>C101,102<br>C103  | C104<br>C105<br>C106<br>C121,122<br>C123,124                                   | C125,126<br>C127,128<br>C129,130<br>C131,132<br>C133,134   | C135,136<br>C140<br>C141,142<br>C143  | C145,146<br>C147<br>C148<br>C149<br>C161,162                                 | C163,164<br>C165,166<br>C167,168<br>C169,170<br>C171,172   |               |

C: China I: Malaysia V: China(Shanghai) M: Other Areas  $\Delta$  indicates safety critical components .

R: Mexico G: Germany H: Korea

P: Canada E: Europe O: Russia

L: Scandinavia Y: PX(Far East, Hawaii) Y: AAFES(Europe)

## **PARTS LIST**

| w Parts     | Parts without <b>Parts No.</b> are not supplied. | Les articles non mentionnes dans le <b>Parts No.</b> ne sont pas fournis. | Teile ohne <b>Parts No</b> , werden nicht deliefert. |
|-------------|--|---|--|
| * New Parts | Parts withou                                     | Les articles i  | Teile ohne P   |

| Re-              |   |  |  |  |  |  |  |             |   |  |   |   |
|------------------|---|--|--|--|--|--|--|-------------|---|--|---|---|
| Desti-<br>nation |   |  |  |  |  |  |  |             |   |  |   |   |
|                  | 1/10W<br>1/10W<br>1/10W<br>1/10W  | 1/10W<br>1/10W<br>1/10W<br>1/10W   | 01/10w<br>01/1<br>00/1<br>00/1   | 1/10w<br>1/10w<br>1/10w<br>1/10w   | 1/10W<br>1/10W<br>1/10W<br>0/1   | 1/10W<br>1/10W<br>1/10W<br>1/10W   | 1/10W<br>1/10W<br>1/10W                      |             |   |  |   |   |
|                  | רררר  | 7777   | 00ددد  | 02770  | ٥٦٦٦٥  | دددد ۵   | ררר  |             |   |  |   |   |
| Description      | 1.0K<br>10<br>22K<br>1.0M   | 0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.0                  | 022<br>227<br>27<br>27<br>27<br>27<br>27                                     | 2.4.7<br>7.7<br>7.7<br>7.7<br>7.7  | <u>\$</u> \$0.8₹   | 0.0<br>100<br>477<br>120<br>120  | 0.00   |             |   |  |   |   |
|                  | 22<br>22<br>24<br>24<br>24<br>24<br>24<br>24<br>24<br>24<br>24<br>24<br>24<br>2 | 00000<br>00000<br>000000<br>0000000000000000000                              | 00000<br>00000<br>EEEEE  | 00000<br>00000<br>000000<br>0000000000000000000                              | 00000<br>00000<br>00000<br>000000<br>000000                                  | 00000<br>00000<br>00000<br>EEEEE   | CHIP R R R R R R                             | PUSH SWITCH | ZENER DIODE<br>ZENER DIODE<br>ZENER DIODE<br>DIODE<br>ZENER DIODE | DIODE<br>DIODE<br>MOS-IC<br>MOS-IC<br>MOS-IC                 | ANALOGUE IC<br>MOS-IC<br>MOS-IC<br>MOS-IC<br>ROM IC                       | DRAM IC<br>MOS-IC<br>MOS-IC                                   |
| Parts No.        | RK73GB2A102J<br>RK73GB2A100J<br>RK73GB2A223J<br>RK73GB2A105J<br>RK73GB2A103J    | RK73GB2A000J<br>RK73GB2A104J<br>RK73GB2A000J<br>RK73GB2A102J<br>RK73GB2A103J | RK73GB2A100J<br>RK73GB2A101J<br>RK73GB2A223J<br>RK73GH2A273D<br>RK73GH2A123D | RK73GB2A101J<br>RK73GB2A1R0J<br>RK73GB2A472J<br>RK73GB2A103J<br>RK73GH2A272D | RK73GH2A103D<br>RK73GB2A103J<br>RK73GB2A000J<br>RK73GB2A101J<br>RK73GH2A153D | RK73GH2A103D<br>RK73GB2A000J<br>RK73GB2A103J<br>RK73GB2A473J<br>RK73GB2A121J | RK73GB2A000J<br>RK73GB2A000J<br>RK73GB2A100J | S68-0157-05 | UDZS2.4B<br>UDZS2.4B<br>UDZS3.9B<br>1SS396-F<br>UDZS2.7B          | CMG02-Q<br>1SS302-F<br>D610A003BPYP<br>PCM1754DB<br>AK4555VT | BA4560RF<br>TC7WH04FK-F<br>S1R72005F00A3<br>MIC2005-05YM6<br>A29L160A1BIA | EM484M1644V6<br>SN74LV244APWR<br>SN74LV245APWR<br>TC75H08E1LE |
| New<br>Parts     |   |  |  |  |  |  |  | *           | *   | * * *  | ***   | * *   |
| Add-             |   |  |  |  |  |  |  |             |   |  |   |   |
| Ref. No          | R195,196<br>R197<br>R199,200<br>R201<br>R202                                    | R203<br>R204<br>R206<br>R207<br>R300-303                                     | R304<br>R400<br>R401<br>R403   | R404<br>R405<br>R406<br>R407<br>R408   | R409<br>R410<br>R411<br>R412<br>R413   | R414<br>R415<br>R500-505<br>R506,507<br>R901                                 | R904<br>R907<br>R911,912                     | 8500        | D100<br>D101<br>D140<br>D200,201<br>D202,203                      | D400<br>D901-903<br>IC1<br>IC14                              | C16,17<br>C20<br>C21<br>C30   | IC31<br>IC32-34<br>IC35,36                                    |
|                  | <u> </u>  |  |  |  |  |  |  |             |   |  | ∢   |   |

| 4 | Ġ |   | ١ |
|---|---|---|---|
| • | Š | i | , |

| Add-   New Parts No.   Description   nation     New Parts No.   Description   nation   New Parts   N   |
|--|
| o         Add- New Farts Ro.         Parts No.         Description           Farts Parts RK73GB2A220J         CHIP R         22         J           RK73GR9A101.1         CHIP R         100         J   |
| Add-   New   Parts No.   Description   |
| o ress Parts No.   1987   Parts No.   Part |
| o Add- New Parts No. ress Parts RK73GB2A220J CHIP  |
| o ress Parts   |
| o ress   |
| •  |
|  |
| Ref. N<br>R23 -25  |

## **PARTS LIST**

|          | Parts No. ne sont pas fournis. |             |             |
|----------|--------------------------------|-------------|-------------|
| upplied. | le Parts No.                   | + nolinfort | L golleder. |

| Re-<br>marks |                                  |  |  |  |  |  |  |  |  |   |  |  |
|--------------|----------------------------------|--|--|--|--|--|--|--|--|---|--|--|
| Desti-       |                                  |  |  |  |  |  |  |  |  |   |  |  |
|              |                                  | HZ)  | 01/1<br>001/1<br>001/1<br>001/1<br>001/1                                     | 1/10w<br>1/10w<br>1/10w<br>01/1  | 1/10W<br>1/10W<br>1/10W<br>1/10W   | 01/1<br>00/1<br>01/1<br>00/1<br>00/1   | 01/1<br>001/1<br>001/1<br>001/1<br>001/1                                     | 1/10W<br>1/10W<br>1/10W<br>1/10W   | 1/10W<br>1/10W<br>1/10W<br>1/10W   | 1/10W<br>1/10W<br>1/10W<br>1/10W  | 1/10W<br>1/10W<br>1/10W<br>1/10W<br>1/10W                                    | 1/10W<br>1/10W<br>1/10W<br>1/10W   |
|              | 16P<br>23P                       | DUH,K<br>9344M                                     | 77777  | 7777   | 7777   | 77777  | הררר   | רררי   | רררר   | 7777  | <u>,</u> ,,,,,   | 77777  |
| Description  | CONNECTOR, 16P<br>CONNECTOR, 23P | FIXED INDUCTOR(10UH,K)<br>AL RESONATOR(16.9344MHZ) | 75<br>1.24<br>2.74<br>4.77<br>7.74   | 820<br>3.6K<br>470<br>330K   | 100K<br>33K<br>47K<br>3.9K<br>62K  | 33K<br>2.2<br>470K<br>75K  | 220K<br>33K<br>4.7K<br>120K<br>33K   | 3.6K<br>330K<br>4.7K<br>1.5K   | 220K<br>82K<br>120K<br>56K<br>56K  | 330<br>220<br>20<br>20<br>20<br>20<br>20                                    | Ž2 <u>2</u> 23   | 1.0<br>4.7K<br>7.5K<br>7.5K<br>16K<br>75                                     |
|              | FLAT CABLE<br>FLAT CABLE         | SMALL FIXED  | 00000<br>00000<br>00000<br>00000   | 111111<br>00000<br>000000<br>000000  | 20000<br>74711<br>7777<br>88888  | 20000<br>201111<br>20111111111111111111111111                                | 20002<br>20002<br>20000<br>20000   | 22222<br>66767<br>88888  | 22222<br>9 9 9 9 9<br>9 9 9 9 9<br>8 8 8 8 8 8                               | 22222<br>22222<br>22222<br>22222  | 99999<br>99999<br>88888  | COHIP<br>COHIP<br>COHIP<br>CHIP<br>R R R R R                                 |
| Parts No.    | E41-1304-05<br>E41-1311-05       | L41-1001-28<br>L77-2412-05                         | RK73GB2A750J<br>RK73GB2A122J<br>RK73GB2A272J<br>RK73GB2A473J<br>RK73GB2A473J | RK73GB2AB21J<br>RK73GB2A362J<br>RK73GB2A471J<br>RK73GB2A474J<br>RK73GB2A334J | RK73GB2A104J<br>RK73GB2A333J<br>RK73GB2A473J<br>RK73GB2A392J<br>RK73GB2A623J | RK73GB2A333J<br>RK73GB2A2R2J<br>RK73GB2A474J<br>RK73GB2A753J<br>RK73GB2A243J | RK73GB2A224J<br>RK73GB2A333J<br>RK73GB2A472J<br>RK73GB2A124J<br>RK73GB2A333J | RK73GB2A362J<br>RK73GB2A334J<br>RK73GB2A472J<br>RK73GB2A2H2J<br>RK73GB2A152J | RK73GB2A224J<br>RK73GB2A823J<br>RK73GB2A563J<br>RK73GB2A124J<br>RK73GB2A563J | RK73GB2A331J<br>RK73GB2A221J<br>RK73GB2A101J<br>RK73GB2A100J<br>RK73GB2A20J | RK73GB2A103J<br>RK73GB2A750J<br>RK73GB2A223J<br>RK73GB2A101J<br>RK73GB2A103J | RK73GB2A1R0J<br>RK73GB2A472J<br>RK73GB2A752J<br>RK73GB2A163J<br>RK73GB2A750J |
| New          |                                  | ****   |  | *****  |  |  |  |  |  |   |  |  |
| Add-         | 3                                |  |  |  |  |  |  |  |  |   |  |  |
| Ref. No      | CN2<br>CN2                       | 22   | 4<br>4<br>88<br>4  | R9<br>R12,11<br>R13  | R15<br>R16<br>R19<br>R19   | R22<br>R23<br>R28<br>R29   | R30<br>R31<br>R32<br>R33<br>R34 ,35  | R36<br>R37<br>R39<br>R40   | R41<br>R43<br>R45<br>R46   | R47<br>R48<br>R50<br>R51  | R52<br>R54<br>R55<br>R66,57<br>R60-63  | R64 -66<br>R67<br>R73 -76<br>R77 ,78<br>R79 -90                              |

| 4 | į, | ١ |   |
|---|----|---|---|
| ų | ŝ  | S | , |

| Desti- Re-<br>nation marks |  |  |              |   |  |  |  |  |   |  |  |  |          |
|----------------------------|--|--|--------------|---|--|--|--|--|---|--|--|--|----------|
|                            |  |  | _            | 0.3WV   | コエスゴス  | X77X.0<br>3W6.3W   | *5***<br>*****   | ****   | 8.3%<br>XDXX.3%   | 6.3W<br>XXXX   | 74<br>16WV<br>74<br>74<br>74<br>74<br>74<br>74<br>74                         | 778.3<br>3W  |          |
| Description                | IC<br>R<br>ANSISTOR  | TRANSISTOR<br>STOR<br>TRANSISTOR<br>STOR                             | (X32-7610-01 | 47UF<br>2.0PF<br>0.10UF<br>6.0PF<br>68PF  | 15PF<br>0.10UF<br>5600PF<br>390PF<br>0.047UF                                   | 0.10UF<br>220PF<br>330PF<br>1000PF<br>47UF                                     | 1000PF<br>220UF<br>6800PF<br>3900PF  | 1000PF<br>0.022UF<br>0.10UF<br>0.33UF<br>1000PF                              | 47UF<br>0.10UF<br>1000DF<br>9.0PF<br>0.10UF                                   | 47UF<br>0.022UF<br>0.010UF<br>2200PF<br>1000PF                               | 0.010UF<br>220UF<br>47UF<br>0.010UF  | 390PF<br>100PF<br>1000PF<br>47UF<br>1.0UF                                      |          |
|                            | ANALOGUE IC<br>FET<br>TRANSISTOR<br>FET<br>DIGITAL TRANSISTOR      | DIGITAL TRANSISTOR<br>TRANSISTOR<br>DIGITAL TRANSISTOR<br>TRANSISTOR | CONTROL (X   | OHPO<br>OHPO<br>OHPO<br>OPO<br>OPO<br>OPO<br>OPO<br>OPO<br>OPO<br>O             | 00000<br>00000   | 2000g  | 22222<br>22222<br>22222<br>22222   |  | ######################################  | ######################################                                       |  | CHIP COHIP COHIP CHIP CHIP CHIP CHIP CHIP CHIP CHIP C                          | 17.6     |
| Parts No.                  | SI-3010KD<br>2SK3018<br>2SC4081(R,S)<br>2SK879-F(Y,GR<br>DTA124EUA | DTC124EUA<br>2SC4081(R,S)<br>DTA124EUA<br>2SC4081(R,S)               | CD CON       | CE32BJ0J470M<br>CC73GCH1H020C<br>CK73GB1H104K<br>CC73GCH1H060D<br>CC73GCH1H680J | CC73GCH1H150J<br>CK73GB1H104K<br>CK73GB1H562K<br>CC73GCH1H391J<br>CK73GB1H473K | CK73GB1H104K<br>CC73GCH1H221J<br>CC73GCH1H331J<br>CK73GB1H102K<br>CE32BJ0J470M | CK73GB1H102K<br>CE32BM1C221M<br>CK73GB1H682K<br>CK73GB1H682K<br>CK73GB1H392K           | CK73GB1H102K<br>CK73GB1H223K<br>CK73GB1H104K<br>CK73GB1A334K<br>CK73GB1A334K | CE32BJ0J470M<br>CK73GB1H104K<br>CK73GB1H102K<br>CC73GCH1H090D<br>CK73GB1H104K | CE32BJ0J470M<br>CK73GB1H223K<br>CK73GB1H103K<br>CK73GB1H222K<br>CK73GB1H102K | CK73GB1H103K<br>CE32BM1C221M<br>CE32BJ0J470M<br>CK73GB1H103K<br>CK73GB1H102K | CC73GCH1H391J<br>CC73GCH1H101J<br>CK73GB1H102K<br>CE32BJ0J470M<br>CK73GB1A105K | opened a |
| New<br>Parts               | 98888P   | 8484   |              | #8888   | 88888  | 88888  | 88888  | 88888  | 88888   | 88888  | 88888  | 88888  | 1011     |
| Add-<br>ress               |  |  |              |   |  |  |  |  |   |  |  |  |          |
| Ref. No                    | ∆ IC42<br>01,2<br>0100,101<br>0102<br>0103                         | 00140<br>0400<br>0401  |              | 28838   | 87822<br>e, 517  | 012<br>012<br>015<br>016<br>010  | C28<br>C28<br>C28<br>C38<br>C38<br>C38<br>C38<br>C38<br>C38<br>C38<br>C38<br>C38<br>C3 | 882388<br>882388   | 234<br>235<br>237<br>39<br>39   | 52<br>52<br>52<br>52<br>53<br>53   | C53<br>C54<br>C55<br>C56<br>C57,58   | C59,60<br>C61,62<br>C63,64<br>C65  |          |

€ €

## **PARTS LIST**

| Re-<br>marks     |  |  |  |   |   |                    |               |   |  |   |   |   |                            |  |
|------------------|--|--|--|---|---|--------------------|---------------|---|--|---|---|---|----------------------------|--|
| Desti-<br>nation |  |  |  |   |   |                    |               |   |  |   |   |   |                            |  |
|                  | 1/10W<br>1/10W<br>1/10W<br>1/10W<br>1/10W                                    | 1/10W<br>1/10W<br>1/10W<br>1/10W   | 1/10W<br>1/10W<br>1/10W                      |   |   |                    |               |   |  |   |   |   |                            |  |
| Description      | 100K<br>75<br>24K<br>180K<br>1.0K<br>1.0K                                    | 4.7K<br>1000<br>1000K<br>7.5<br>147K   | 1.0<br>75<br>0.0                             |   | R IC  | OR.                | (X92-2470-21) | SIS 62-1001-00<br>2-626-908-(61)<br>2-262-907-(11)<br>2-627-003-(02)    | 21-1006-00<br>60-4003-00<br>1MM,16P,L=75<br>RING (GLD)<br>RING (SLV)   | (20-4009-01)<br>30-1005-00<br>60-1002-00<br>I 20-3002-00                | 30-2001-00<br>30-4008-00<br>(20-4004-01)<br>62-4004-00<br>62-4003-00    | FEW<br>E SCREW<br>X-2612-682-(1)<br>X-2625-769-(1)  | X60-3001-20A<br>KSS-213CH  |  |
| Dec              | 00000000000000000000000000000000000000                                       | 00000000000000000000000000000000000000                                       |  | DIODE<br>DIODE<br>ZENER DIODE<br>ANALOGUE IC<br>MOS-IC    | ANALOGUE IC<br>MICROPROCESSOR IC<br>ANALOGUE IC<br>TRANSISTOR<br>DIGITAL TRANSISTOR | DIGITAL TRANSISTOR |               | CHASSIS<br>SUB CHASSIS<br>ROD<br>GEAR 2-262-6<br>GEAR 2-627-0           | PULLEY 21-1006-00 BELT 60-4003-00 FLAT CABLE 1MM, 16P, L=7 COMPRESSION SPRING (GLD) COMPRESSION SPRING (GLD) | INSULATOR (20-<br>CLAMPER<br>TRAY<br>LEVER SWITCH<br>LEAF SWITCH        | YORK<br>MAGNET<br>TAPTITE SCREW<br>SCREW<br>SCREW                       | PAN HEAD SCREW BINDING HEAD SCREW AND HEAD TAPTITE SCREW SUB CHASSIS X-2612-582-(1) MOTOR ASSY X-2625-769-(1) | MOTOR ASSY<br>PICKUP       |  |
| Parts No.        | RK73GB2A104J<br>RK73GB2A750J<br>RK73GB2A243J<br>RK73GB2A184J<br>RK73GB2A102J | RK73GB2A472J<br>RK73GB2A101J<br>RK73GB2A104J<br>RK73GB2A750J<br>RK73GB2A473J | RK73GB2A1R0J<br>RK73GB2A750J<br>RK73GB2A000J | 1SS355<br>1SS355<br>UDZS2.7B<br>AN22000A-V<br>MN6627482WA | BA5983FM<br>MN101C427KJ<br>NJM2100M-ZB<br>2SA1577(Q,R)<br>DTA114EUA                 | DTA114EUA          | CD MECHANISM  | A10-3624-08<br>A11-1237-08<br>D10-3606-08<br>D13-1720-08<br>D13-2605-08 | D15-0459-08<br>D16-0811-08<br>E35-3857-05<br>G01-4353-05<br>G01-4354-05                                      | J02-1557-05<br>J11-0905-08<br>J99-0855-18<br>S64-0064-08<br>S74-0065-05 | T50-1099-08<br>T99-0697-08<br>N09-5488-05<br>N09-5544-08<br>N09-5545-08 | N39-2025-48<br>N35-2003-48<br>N83-2006-48<br>A11-1223-08<br>T42-0817-08                                       | T42-1155-08<br>T25-0132-08 |  |
| New<br>Parts     |  |  |  |   |   |                    |               |   | *  | *   | 4,  |   |                            |  |
| Add-             |  |  |  |   |   |                    |               | 88888<br>88888  | 38884A   | 882288  | <b>6</b> 6  | 388   | 38<br>34                   |  |
| Ref. No          | R91<br>R92<br>R94<br>R95   | R96<br>R97<br>R100<br>R103   | R104<br>R105<br>R151-153                     | 29725<br>4.6.   | 25529<br>£  | 9<br>9<br>9        |               | 1652-   | 2122   | £ 4 3 3 3 3 4 4 4 4 5 4 5 4 5 4 5 4 5 6 5 6 5 6 5 6                     | AABA 25   | A A A B A B A B A B A B A B A B A B A B   | ĀΞ                         |  |

### **SPECIFICATIONS**

### Main unit (RD-K501USB)

| [Amplifier block ]   |
|--|
| Effective output power during STEREO operation (1 kHz,         |
| 10%, T.H.D., at 6 Ω )  |
| Total harmonic distortion                                      |
| D-BASS (+10)+9.0 dB (60Hz, Vol. 30)                            |
| Input (Sensitivity/impedance)                                  |
| LINE (AUX) 350 mV / 22 kΩ (Max INPUT LEVEL)                    |
| LINE (D. AUDIO) 350 mV / 10 kΩ (Max INPUT LEVEL)               |
| Output (Level/Impedance) PRE OUT (D. AUDIO)900 mV/10 kΩ (HIGH) |
| 550 mV/10 kΩ (LOW)   |
| SUB WOOFER PREOUT 1.6 V/10 kΩ                                  |
|  |
| [USB block]  |
| Usable USB device USB Mass strage class                        |
| Interface USB 2.0 (Full speed) USB 1.1 compatible              |
| File format FAT 12/16/32                                       |
| Recording format   |
| WMA SQ   |
| Playing format   |
| MP3 Sampling frequency 8~48 kHz                                |
| Bit rate (CBR/VBR *) 32~320 kbps                               |
| WMA (WMA9 compliant, DRM non-correspondence)                   |
| Sampling frequency 8~48 kHz                                    |
| Bit rate (CBR/VBR *) 64~384 kbps                               |
| ID3 tag Non-correspondence Maximum numbers of folders          |
| Maximum folder hierarchical number                             |
| Maximum numbers of files                                       |
| Maximum current drain 500 mA                                   |
|  |
| [Memory card block]  |
| Usable memory card SD memory card, miniSD™ card                |
| Usable memory card capacity                                    |
| File system FAT 12/16/32                                       |
| Recording format WMA SQ 128 kbps/44.1 kHz STEREO               |
| HQ 192 kbps/44.1 kHz STEREO                                    |
| Playing format   |
| MP3 Sampling frequency 8~48 kHz                                |
| Bit rate (CBR/VBR *) 32~320 kbps                               |
| WMA (WMA9 compliant, DRM non-correspondence)                   |
| Sampling frequency 8~48 kHz                                    |
| Bit rate (CBR/VBR *)   |
| Maximum numbers of folders                                     |
| Maximum folder hierarchical number                             |
| Maximum numbers of files 1000                                  |

<sup>\*</sup> The audio data of VBR may become beyond the limits of the bit rate the above-mentioned, and may not be playable on this system.

#### [CD player block]

| Laser              | Semiconductor laser |
|--------------------|---------------------|
| D/A converter      | 1 bit               |
| Oversampling       | 8 fs (352.8 kHz)    |
| Frequency response | 20 Hz~20 kHz        |
| Wow & flutter      |                     |

#### [Tuner block]

| FM tuner               |                     |
|------------------------|---------------------|
| Tuning frequency range | . 87.5 MHz~108 MHz  |
| AM tuner               |                     |
| Tuning frequency range | . 531 kHz~1,602 kHz |

#### [Power supply and other blocks]

| Power consumption         | 73 W                       |
|---------------------------|----------------------------|
| Standby power consumption | 0.4 W or less              |
| Dimensions                |                            |
|                           | Height 121.5 mm (4-13/16") |
|                           | Depth 361 mm (14-3/16")    |
| Weight (net)              | 5.3 kg(11.7 lb)            |

### Speakers (LS-K501)

| Enclosure                  | Bass-Refrex system       |
|----------------------------|--------------------------|
| Speaker unit configuration |                          |
| Woofer                     | 100 mm cone type         |
| Tweeter                    | 25 mm balanced dome type |
| Impedance                  | 6 Ω                      |
| Power handling capacity    | 20 W                     |
| Dimensions                 | Width 140 mm (5-1/2")    |
|                            | Height 260 mm (10-1/4")  |
|                            | Depth 209 mm (8-1/4")    |
| Weight (net)               | 2.2 kg (4.9 lb) (1 pcs)  |
|                            |                          |

- Design and specifications are subject to change without notice.
- Full performance is not guaranteed in extremely cold environments (under water-freezing temperatures).

